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PHYTOGEOGRAPHIC STUDIES IN THE ATHABASKA — GREAT SLAVE LAKE REGION

I. CATALOGUE OF THE VASCULAR PLANTS¹

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With plates 195–200

BETULACEAE

Corylus cornuta Marsh. — *C. rostrata* Ait. — Common or occasional in upland woods in the southern part of the region, and not known north of the lower Athabaska. — McMurray, no. 7083; along the Firebag R. near its mouth, no. 6041.

Betula papyrifera Marsh. — Most of the white birches in the Mackenzie basin fall into one or the other of the following varieties, but the typical species is at least occasional on the southern boundaries. — McMurray, no. 7102.

Betula papyrifera Marsh. var. **occidentalis** Sarg. — This is the common form in the mountains of the upper Peace River region, and is also known at Lesser Slave Lake and about Lake Athabaska. On the south shore of the latter it is quite common on old beach ridges. — Lake Athabaska: Charlot Pt., no. 6218; Cornwall Bay, no. 6601; sand dunes on point about 4 mi. E. of Wolverine Pt., no. 6801; in pine-spruce woods near shore about 2 mi. E. of Wolverine Pt., trees about 20 feet high, nos. 6834, 6835, 6836.

Betula papyrifera Marsh. var. **neolaskana** (Sarg.) Raup. — *B. alascana* Sarg., not Lesquereux. — *B. neolaskana* Sarg. — See Contr. Arnold Arb. 6: 152 (1934). — Common to abundant in upland woods throughout the region. The variety is distinguished mainly by its resinous-glandular twigs, and there are many forms which appear transi-

¹Continued from p. 240.

tional to the non-glandular typical species. But the very glandular forms are much the commonest in our region, and appear to constitute a good geographic variety. Trees 6–10 inches in diameter are usual, but they occasionally reach 12–15 inches in good soils. — Calumet, Athabaska R., no. 598. Lake Athabaska: Shelter Pt., nos. 592, 593, 594, 595, 596, 597, 606, 4463; Sand Pt., nos. 4583, 4585; 5 mi. E. of Poplar Pt., nos. 6656, 6668; 2 mi. E. of Wolverine Pt., no. 6714; gravel dunes just E. of Ennuyeuse Cr., no. 6920; 2 mi. W. of Ennuyeuse Cr., no. 6947. Along Quatre Fourches R., nos. 601, 605; upper Slave R. lowland, no. 2181; lower Slave R., no. 604. Great Slave L.: Taltheilei Narrows, no. 607; Fairchild Pt., nos. 600, 602, 603; Ft. Reliance, no. 591; Yellowknife Bay, no. 599; N. W. shores, *Bedford* (O).

Betula microphylla Bunge. — *B. fontinalis* Sarg. — Rare or occasional, but of wide distribution northward at least to Great Slave Lake. It grows on muskeg lake shores in the Wood Buffalo Park, but on rocky or sandy uplands in the pre-Cambrian country. A form with prominently spreading lateral lobes of the fruiting bracts was found in the shifting sand dunes south of William Point (no. 6889), and may prove, with more material, to be worthy of distinction. — Lake Athabaska: sand dunes about 5 mi. S. of William Pt., no. 6889. Great Slave L.: Fairchild Pt., nos. 588, 589; Ft. Reliance, no. 590.

Betula pumila L. var. *glandulifera* Regel. — Known in the Mackenzie basin from two collections, one in the Wood Buffalo Park and the other at Fort Smith. The former was growing in an upland muskeg. — Fort Smith, Slave R., *Dutilly*, no. 95 (G).

Betula glandulosa Michx. — Abundant in muskeg thickets throughout the wooded country and far into the Arctic. In the sand dunes south and southwest of William Point, Lake Athabaska, was found a form (nos. 6884, 6919) with scarcely glandular twigs and with its leaves very shiny above and strongly cuneate at the base. It grows in great clumps 8–10 feet high and serves to stabilize the shifting sand. Further material and study may justify giving it varietal distinction, but owing to the great variability of *B. glandulosa* in these characters throughout its range it is thought advisable to leave it here for the present. — Lower Athabaska R., *Kennicott* (N); Calumet, Athabaska R., no. 586. Lake Athabaska: near Sand Pt., no. 4540; mouth of Charlot R., nos. 6312, 6341; 5 mi. E. of Poplar Pt., no. 6642; along Archibald R. south of Wolverine Pt.; no. 6730; about 3 mi. E. of Wolverine Pt., no. 6815; dunes about 5 mi. S. of William Pt., no. 6884; dunes just E. of Ennuyeuse Cr., no. 6919; muskeg about 3 mi. W. of Ennuyeuse Cr., no. 6960; muskeg about 2 mi. W. of Ennuyeuse Cr., no. 6998. Great Slave L.:

R. Bell, no. 23157 (O); Taltheilei Narrows, no. 587; Maufelly Pt., no. 581; Fairchild Pt., nos. 580, 582, 583, 584, 585; Pike's Portage, *J. W. Tyrrell*, no. 23125 (O). Artillery L., *J. W. Tyrrell* (O); and *Seton & Preble*, no. 78291 (O) (*B. nana* of Seton's list).

***Alnus crispa* (Ait.) Pursh.** — *A. alnobetula* Amer. auth. — Common to abundant throughout the wooded country, chiefly in coniferous timber. Seton and Preble give its range as northward to the limit of trees, but it was noted in Fl. Bor.-Am. as growing also in the barren country. *J. W. Tyrrell* collected it on the shore of Carey Lake, on the Dubawnt River, well within the barren lands. — McMurray, no. 7109. Lake Athabaska: Shelter Pt., nos. 624, 625; near Sand Pt., no. 4524; Charlot Pt., no. 6215; Cornwall Bay, no. 6600; along Archibald R., S. of Wolverine Pt., no. 6740. Along Quatre Fourches R., no. 622; upper Slave R. lowland, no. 2186. Great Slave L.: Taltheilei Narrows, no. 621; Fairchild Pt., nos. 620, 623; Yellowknife Bay, no. 626. Between Fts. Simpson and Chipewyan, *Richardson* (G) (*A. viridis* of Fl. Bor.-Am. and Macoun's Cat.).

***Alnus crispa* (Ait.) Pursh var. *elongata*, var. nov.** PLATE 195¹

A forma typica differt strobilis fructiferis multo elongatis (1.2–2.4 cm. longis et 0.5–0.9 cm. latis, plerisque 2×0.8 cm.), ellipticis vel subinde cylindricis, bracteis inferioribus distanter dispositis itaque strobilo basi attenuato.

Sandy beach on the north shore of Lake Athabaska a few miles west of Sand Point, Sept. 9, 1932, *Raup & Abbe*, no. 4665 (Type, A).

Except for its long cones, which are at once striking and distinctive, this alder is closely similar to the common *A. crispa* of the region. The type material is from a large spreading shrub, perhaps 8 feet high, growing at the upper edge of the sandy lake beach. It is of particular interest because the elongated cone affords evidence of anatomical structure not to be had in the usual forms. It has been described and figured with considerable detail by Dr. Ernst C. Abbe in his studies of inflorescence anatomy in the Betulaceae.²

***Alnus incana* (L.) Moench.** — Abundant on lake shores and river banks northward in the wooded country at least to Great Slave Lake. Noted by *Richardson* at Fort Franklin and by *Preble* on Peel River. It is very doubtful if American plants of this relationship are identical with the Old World *A. incana*, but until a critical study of the problem is made the above name will serve. Western specimens are commonly

¹PLATE 195. *Alnus crispa* (Ait.) Pursh var. *elongata* Raup. Part of type collection from the north shore of Lake Athabaska west of Sand Pt., no. 4665; detail of cone $\times 3$.

²Bot. Gaz. 97: 4–8, figs. 8–22 (1935).

called *A. tenuifolia* Nutt., but the writer has not been able to distinguish those cited below from the common eastern form usually called *incana*. — McMurray, no. 7108; Calumet, Athabaska R., nos. 609, 614. Lake Athabaska: Shelter Pt., nos. 610, 615; Sand Pt., no. 4582; Charlot Pt., nos. 6213, 6214; 5 mi. E. of Poplar Pt., no. 6681; along Archibald R., S. of Wolverine Pt., no. 6729; bank of William R. near its mouth, no. 6873. Along Quatre Fourches R., nos. 608, 612; upper Slave R. lowland, nos. 619, 2189. Great Slave L.: Fairchild Pt., nos. 613, 617; Ft. Reliance, no. 618; Yellowknife Bay, no. 616; N. W. shore, *Bedford* (O).

URTICACEAE

Urtica gracilis Ait. — See Rhod. 28: 191 (1926). — Common in damp meadows, prairies, and cabin clearings northward in the Paleozoic and younger country to the Wood Buffalo Park, and at least occasional on the western arm of Great Slave Lake. It was noted on Great Bear Lake by Richardson. — Upper Slave R. lowland, nos. 641, 2205, 2206; N. W. shore of Great Slave L., *Bedford* (O).

SANTALACEAE

Comandra pallida A. DC. — Occasional on dry prairies and sandy hills northward to the Wood Buffalo Park, chiefly west of the Paleozoic boundary. For a discussion of parasitism in this species and the following, see a paper by E. H. Moss in the New Phytologist, 25: 264–76 (1926). — Calumet, Athabaska R., nos. 642, 643; sandy open woods near Moose Pt., S. shore of L. Athabaska, no. 7015.

Geocaulon lividum (Richards.) Fern. — *Comandra livida* Richards. — See Rhod. 30: 21 (1928). — Common in woodlands throughout the region. Dwarfed forms with variegated leaves are frequently found, and are treated at some length by Moss in the paper cited under the preceding species. — Calumet, Athabaska R., no. 649. Lake Athabaska: Shelter Pt., nos. 650, 652, 653, 654; Charlot Pt., no. 6083; Cornwall Bay, no. 6593; 5 mi. E. of Poplar Pt., no. 6689. Along Quatre Fourches R., no. 644; upper Slave R. lowland, no. 2196; Ft. Smith, no. 648. Great Slave L.: Taltheilei Narrows, no. 645; Fairchild Pt., nos. 646, 651; Ft. Reliance, no. 647; S. W. and N. shores, *Howe*, no. 91983 (O); N. W. shore, *Bedford* (O).

LORANTHACEAE

Arceuthobium americanum Nutt. — *Razoumofskyia americana* (Nutt.) Ktze. — This species has been very little collected, and may prove to be common far northward. The following specimens, with a note of another from Lesser Slave Lake (*Brinkman*), are the only rec-

ords available for most of the Mackenzie basin. It grows on *Pinus Banksiana*. — Lake Athabaska: Shelter Pt., no. 4449; Sand Pt., no. 4472.

POLYGONACEAE

Rumex occidentalis S. Wats. — Common in wet sloughs and on river banks northward to the Wood Buffalo Park, and at least occasional on Great Slave and Great Bear Lakes (*J. M. Bell*, O). Eastward it is occasional on damp sandy lake beaches, but not far from the Paleozoic boundary. — Calumet, Athabaska R., no. 665; Shelter Pt., L. Athabaska, nos. 666, 667; upper Slave R. lowland, nos. 2214, 2216. Great Slave L.: Yellowknife Bay, no. 668; N. W. shore, *Bedford* (O).

Rumex mexicanus Meissn. — Common in damp meadows and sloughs northward to the Wood Buffalo Park, and occasional on the north shore of Lake Athabaska and the western side of Great Slave Lake. In Fl. Bor.-Am. *R. salicifolius*, which is here *R. mexicanus* at least in part, is noted on Great Bear Lake and the Mackenzie River. — McMurray, no. 7052; lower delta of Athabaska R., no. 670. Lake Athabaska: Shelter Pt., nos. 669, 671; Sand Pt., no. 4495; Charlot Pt., no. 6395. East shore of L. Mamawi, nos. 2225, 2227, 4404. Great Slave L.: N. W. shore, *Bedford* (O).

Rumex maritimus L. var. **fueginus** (Phil.) Dusén. — See *Rhod.* 17: 73 (1915). — Common in damp meadows and at slough margins, mainly in the Paleozoic or younger areas northward to the Wood Buffalo Park, and at least occasional on the western arm of Great Slave Lake. — Lower delta of Athabaska R., no. 673; Shelter Pt., L. Athabaska, no. 672; upper Slave R. lowland, nos. 2220, 2221, 2222; N. W. shore of Great Slave L., *Bedford* (O).

Polygonum prolificum (Small) B. L. Robinson. — Known in the Mackenzie basin from a single locality in the Salt Plain region of the Wood Buffalo Park.

Polygonum aviculare L. — Common in damp sloughs, rock crevices and cabin clearings throughout the lowlands northward to Great Slave Lake, and occasional in the upland districts west of the Slave River. Noted in Fl. Bor.-Am. north to Lat. 65°. — Reed's Portage, upper delta of Athabaska R., no. 2234; E. shore of L. Mamawi, no. 2233; upper Slave R. lowland, no. 2232; Ft. Smith, no. 658; N. W. shore of Great Slave L., *Bedford* (O).

Polygonum Douglasii Greene. — Known in our region only at the western end of L. Athabaska, where it grows in small patches of soil among the granite hills. — Fort Chipewyan, nos. 4696, 7043.

Polygonum viviparum L. — *Bistorta vivipara* (L.) S. F. Gray. —

Common in muskegs and on damp sandy lake shores in the more arctic parts of the region. Southward it is only occasional. — Calumet, Athabaska R., no. 657. Great Slave L.: Fairchild Pt., nos. 655, 656; Windy Pt., *Hume*, no. 102660(O).

Polygonum lapathifolium L. var. *salicifolium* Sibth. — *P. tomentosum* Schrank var. *incanum* (Schmidt) Gürke. — See Rhod. **23**: 259 (1921). Occasional on damp slough margins northward at least to the Wood Buffalo Park, mainly west of the Paleozoic boundary. In the pre-Cambrian it has been found only on damp sandy shores near the western end of Lake Athabaska. A note in Fl. Bor.-Am. under *P. Persicaria* var. *minus*, "Saskatchewan to Great Bear Lake. Dr. Richardson," probably refers to this species. — Shelter Pt., L. Athabaska, nos. 659, 660, 661; E. shore of L. Mamawi, no. 2254.

Polygonum natans A. Eat. and forma *Hartwrightii* (Gray) Stanford. — See Rhod. **27**: 156-62 (1925). — Common on lake and slough margins, and in sluggish streams northward to Great Slave Lake. It has not been observed about the eastern arm of Great Slave Lake, but Harper reported a *Polygonum amphibium* at the junction of the Tazin and Taltson Rivers which may have been this species. The creeping mud plant with hairy leaves and stem, sometimes known as *P. Hartwrightii*, is clearly no more than a form of the aquatic one. — Delta of Athabaska R., no. 2248. Lake Athabaska: Shelter Pt., nos. 662, 664; near mouth of Charlot R., no. 6348; pond near base of Cornwall Bay, no. 6613; 2 mi. W. of Ennuyeuse Cr., nos. 6987, 6989. East shore of L. Mamawi, nos. 2249, 2250, 4407; upper Slave R. lowland, nos. 2241, 2242, 2246, 2251; Ft. Smith, no. 663; N. W. shore of Great Slave L., *Bedford* (O).

POLYGONUM CONVULVULUS L. — *Bilderdykia Convolvulus* (L.) Dum. — Occasional in dry cleared ground along the main routes of travel in the Wood Buffalo Park, and probably southward. — East shore of L. Mamawi, nos. 2237, 2239; upper Slave R. lowland, no. 2236.

CHENOPODIACEAE

Chenopodium capitatum (L.) Asch. — *Blitum capitatum* L. — Rather common in the northern and northeastern part of the area, usually in disturbed soil, as in settlements and cabin clearings. — Upper Slave R. lowland, no. 2266; Ft. Smith (*Mrs. Conibear*, coll.) no. 676; lower Slave R., no. 675. Great Slave L.: N. shore of McLeod Bay, no. 677; Fairchild Pt., no. 674; N. W. shore, *Bedford* (O).

Chenopodium glaucum L. — The only authentic record in the Mackenzie basin is cited below. It has been reported on the Peace River and at Lesser Slave Lake, and there is a note in the botanical

appendix to Back's Narrative, "Athabasca," the significance of which is unknown. — Damp soil on bank of Athabaska R., McMurray, no. 7063.

Chenopodium rubrum L. — Known in the Mackenzie basin from a single locality in the Wood Buffalo Park, on the Salt Plains west of the upper Slave River.

Chenopodium album L. — Abundant as a weed in settlements and cabin clearings, and occasional in burned-over country or in meadows, northward at least to the Wood Buffalo Park. On Lake Athabaska it usually grows on damp shores. Noted on the Slave River and at the mouth of the Taltson by Harper, and from "Lake Huron . . . to Bear Lake" by Richardson. — McMurray, nos. 7060, 7079. Lake Athabaska: Shelter Pt., no. 678; cabin clearing about 3 mi. W. of Ennuyeuse Cr., no. 6958. East shore of L. Mamawi, nos. 2269, 2270; upper Slave R. lowland, nos. 2275, 2276.

Chenopodium lanceolatum Muhl. — *C. album* L. var. *viride* (L.) Moq. — Known in the Mackenzie basin only from collections in dry upland prairies in the Wood Buffalo Park.

Chenopodium leptophyllum Nutt. — Apparently rare or occasional in our region, and confined to dry semi-open prairies. Known also at Ft. Franklin (*Richardson*, G). — Small prairie on granite hill, E. shore of L. Mamawi, no. 2278.

Atriplex patula L. — This and its variety are known in the Mackenzie basin only from the Wood Buffalo Park where they grow in semi-saline situations, and together make an extremely variable group of plants which needs further study. An unverified record in the botanical appendix to Back's Narrative for *A. litoralis*, "Athabasca," may refer to this species. — Upper Slave R. lowland (Gov. Hay Camp), no. 2258.

Atriplex patula L. var. *hastata* (L.) Gray. — Common on the Salt Plain in the Wood Buffalo Park.

AXYRIS AMARANTHOIDES L. — An introduced weed known only from a single collection. — McMurray, no. 7117.

Corispermum hyssopifolium L. — The only authentic Mackenzie basin record is cited below. Noted by Macoun on the Peace River. — Great Slave L.; *Richardson* (G).

Salicornia europaea L. — Abundant at the margins of saline flats and brine springs west of the Slave River, and reported in the southwestern part of the Mackenzie basin.

Suaeda depressa (Pursh) S. Wats. — *Dondia depressa* (Pursh) Britton. — At least occasional at the margins of saline flats in the Wood Buffalo Park, and noted in the southwestern part of the Mackenzie basin by Macoun.

CARYOPHYLLACEAE

Stellaria borealis Bigelow. — *Alsine borealis* (Bigelow) Britton. — See Rhod. 16: 144–51 (1914). — Common in wet meadows, sloughs, or in muskegs, and on damp shores. Known northward to the Mackenzie and Great Bear Lake (*Onion*, N; *J. M. Bell*, O). — Lake Athabaska: Shelter Pt., nos. 724, 4455; Sand Pt., no. 4492; Cornwall Bay, no. 6490. Upper Slave R. lowland, nos. 2315, 2316; Ft. Smith, no. 728. Great Slave L.: Keith Isl., no. 725; Taltheilei Narrows, nos. 726, 727; N. W. shore, 12 mi. E. of Moraine Pt., *Bedford* (O).

Stellaria crassifolia Ehrh. — *Alsine crassifolia* (Ehrh.) Britton. — Occasional in muskeg sloughs northward at least to the Wood Buffalo Park. A record in Fl. Bor.-Am. under *S. gracilis*, "About Slave Lake," is probably referable to this, and also one in Macoun's Cat., "Methye River, near Portage la Loche."

Stellaria longipes Goldie. — *Alsine longipes* (Goldie) Cov. — Common or abundant throughout the region, and northward to the lower Mackenzie and Great Bear Lake (*Miss E. Taylor*, O; *J. M. Bell*, O). It grows in a variety of habitats, from dry prairies and beaches to sloughs and muskegs. A glaucous form with erect leaves is commonly called var. *laeta* (Richards.) Wats., but the many intergrading forms which fail to show any regional segregation in this country, have led the writer to merge the two. — Calumet, Athabaska R., no. 712. Lake Athabaska: Chipewyan, nos. 6060, 7032; Shelter Pt., nos. 706, 707; Sand Pt., nos. 4497, 4543; Charlot Pt., nos. 6102, 6103, 6303; shore of main lake just W. of Ellis Bay, no. 6268; mouth of Charlot R., no. 6333; Cornwall Bay, no. 6555; 2 mi. E. of Wolverine Pt., no. 6720. East shore of L. Mamawi, nos. 2336, 2337; Ft. Smith, no. 717; and *Dutlilly*, no. 94(G); and *Seton & Preble*, no. 78318(O); and *Miss E. Taylor* (G, O). Great Slave L.: Resolution, *Kennicott* (N); Taltheilei Narrows, no. 709; Fairchild Pt., nos. 708, 711, 716; Ft. Reliance, nos. 713, 714, 715; Hay R., *Hume*, no. 102661(O); S. W. and N. shores, *Howe*, no. 91981(O); Yellowknife R., *Russell* (O).

Stellaria arenicola, sp. nov.

PLATE 196¹

Herba perennis glabra, subviridis et lucida, caulibus satis gracilibus laxis quadrangularibus ex radice repente ascendentibus et supra ramosis; caules 1–4 dm. longi; folia lanceolata, 0.8–2.8 cm. longa, ad 4 mm. lata, supra basin latissima, 1-nervia, pleraque ascendentia, argute acuta, inferiora minora; cymae terminales, patulae, 1–5-ramosae, pedicellis

¹PLATE 196. *Stellaria arenicola* Raup. Part of type collection from sand dunes south of William Pt., L. Athabaska, no. 6882; details of capsules $\times 2$ (capsules on the right are from no. 6910). Habit photo. taken on same dune area, just E. of Ennuyeuse Cr., Aug. 20, 1935.

gracilibus 0.3–2.5 cm. longis; bracteae scariosae, lanceolatae, 2–4 mm. longae; sepala ovata, obtusa vel late acuta, medio 3-nervia et viridia, marginibus latis scariosis, 3–3.5 mm. longa, 1.5–2 mm. lata; petala circa 5 mm. longa, alba, aliquando fere ad basin divisa; capsula straminea, anguste ovoidea, circa 6 mm. longa, apicibus valvularum recurvatis et post dehiscenciam revolutis; styli 3; semina circa 1 mm. longa, minute asperata.

Among inland shifting sand dunes south of William Point, south shore of Lake Athabaska, Sask., Aug. 16, 1935, no. 6882 (Type, G). Two other numbers were collected from the same dune area: no. 6883 is from the same locality as the type, while no. 6910 was obtained about four miles to the westward on Aug. 20, 1935. Both nos. 6883 and 6910 have older capsules than no. 6882.

In habit and general appearance this plant most nearly resembles *S. graminea* L. and *S. longipes*. It differs sharply from *S. graminea* in having ovate, obtuse or broadly acute sepals with broad scarious margins which entirely surround the apex, and in having the valves of its capsules recurved and rolled back after dehiscence. Furthermore the seeds, although clearly roughened, are not deeply sculptured as in *S. graminea*. Also its leaves are not ciliate at the base as in the latter species. From *S. longipes* it differs in having straw-colored capsules with reflexed and rolled valves in the mature condition. It grows in the actively shifting sands and serves as a fixing agent for small dunes.

***Stellaria longifolia* Muhl. — *Alsine longifolia* (Muhl.) Britton.** — Abundant in wet meadows, damp prairies and muskegs northward at least to the Wood Buffalo Park, and known on the Mackenzie (*Kennicott*, N). Apparently rare in the pre-Cambrian. — Lake Athabaska: mouth of Charlot R., no. 6360; Cornwall Bay, no. 6490-a. East shore of L. Mamawi, no. 2303; Peace delta and upper Slave R. lowland, nos. 720, 721, 722, 2309; Ft. Smith, nos. 718, 723; Yellowknife Bay, Great Slave L., no. 719.

***Stellaria media* (L.) Cyrill. — *Alsine media* L.** — Known in our region from a single collection on Lake Athabaska, and not thus far found to the northward. — Damp thicket at Chipewyan, no. 4673.

***Cerastium alpinum* L. var. *glanduliferum* Koch.** — See Rhod. 22: 169–79 (1920). — Known in the Mackenzie basin only from the following. It grows in rock crevices and on gravelly shores. — Great Slave L.: Taltheilei Narrows, no. 698; Fairchild Pt., nos. 696, 697.

***Cerastium Beeringianum* Cham. & Schl.** — See Rhod. 22: 169–79 (1920). — Common on damp shores and in rock crevices on the north side of Lake Athabaska, but apparently rare elsewhere in the region. —

Lake Athabaska: near Sand Pt., no. 4493; W. shore of Ellis Bay, no. 6163; Charlot Pt., nos. 6230, 6384; mouth of Charlot R., no. 6338; Fishhook Bay, no. 6587. Near Ft. Smith, no. 694.

Cerastium nutans Raf. — Occasional on damp sandy lake and slough margins and in damp rock crevices northward to the Wood Buffalo Park, but scarcely known eastward of the Paleozoic boundary. — Chipewyan, no. 4702; E. shore of L. Mamawi, no. 2296.

Cerastium arvense L. — See Rhod. 22: 178-9 (1920). — Common in rather dry prairie openings and rock crevices in the Wood Buffalo Park and southwestward, but scarcely known east of the Paleozoic boundary. — Chipewyan, no. 6072; and near Chipewyan, Athabaska R., *Harper*, no. 91209(O).

Sagina nodosa (L.) Fenzl. — Common in damp rock crevices and on damp sandy shores in the pre-Cambrian country. Noted in Fl. Bor.-Am., under *Spergula nodosa*, "Ontario, to the shores of the Arctic Sea, eastward of the Mackenzie River." — Lake Athabaska: Shelter Pt., nos. 700, 701, 702, 4428; Sand Pt., nos. 4484, 4542; W. shore of Ellis Bay, no. 6370; small island near base of Charlot Pt., no. 6379. Great Slave L.: Fairchild Pt., nos. 703, 704; Ft. Reliance, no. 704.

Arenaria verna L. var. **pubescens** (Cham. & Schl.) Fern. — See Rhod. 21: 21-2 (1919). — An arctic species common or occasional in rock crevices, mainly in the pre-Cambrian areas. — Clearwater R., lat. 56°, *J. M. Macoun*, no. 4868(O). Lake Athabaska: Chipewyan, nos. 4682, 7029; Charlot Pt., nos. 6104, 6258; Cornwall Bay, no. 6564. Great Slave L.: nos. 691, 692.

Arenaria humifusa Wahlenb. — *A. cylindrocarpa* Fern. — See Nordhagen, Bergens Mus. Årbok 1935, Naturvidenskap. rek. no. 1 (1935). — Apparently rare in the Mackenzie basin, and known from a single collection on Great Slave Lake. It was growing on a stony-sandy shore. — Fairchild Pt., no. 693.

Arenaria dawsonensis Britton. — *A. litorea* Fern. — See Mem. Amer. Acad. 15: 276 (1925). — Occasional to common in the pre-Cambrian regions, growing in damp rock crevices and on lake shores. It is occasional in meadows and muskegs in the Wood Buffalo Park. Records for *A. stricta* in Fl. Bor.-Am., and for *A. Michauxii* in Macoun's Cat., "... to the shores of the Arctic Sea," may refer to this species. — Lake Athabaska: Shelter Pt., no. 690; Charlot Pt., nos. 6136, 6309; Cornwall Bay, no. 6453; limestone hill N. E. of Cornwall Bay, nos. 6526, 6541-a. Great Slave L.: Keith Isl., no. 689; Maufelly Pt., no. 686; Fairchild Pt., nos. 687, 688.

Arenaria lateriflora L. — *Moehringia lateriflora* (L.) Fenzl. —

See Rhod. 19: 259 (1917). — Common to abundant in shady woods throughout the Paleozoic and younger country northward to the lower Mackenzie (*Dutilly*, G; *Miss E. Taylor*, O, G), but scarcely known in the pre-Cambrian. — Waterways, no. 2282; Calumet, Athabaska R., no. 682; E. shore of L. Mamawi, no. 2286; upper Slave R. lowland, nos. 684, 685; Ft. Smith, no. 683. Great Slave L.: Resolution, *Miss E. Taylor*, no. 51(O); N. W. shore, *Bedford* (O); near Ft. Rae, *Russell* (O).

***Arenaria macrophylla* Hook.** — Apparently common in rich woods on rocky hills and old lake beaches in the pre-Cambrian areas, but not known elsewhere in the Mackenzie basin. — Lake Athabaska: W. shore of Ellis Bay, no. 6165; Charlot Pt., nos. 6280, 6388; near Cornwall Bay, S. of Wabba L., no. 6482. Great Slave L.: Taltheilei Narrows, no. 679; Fairchild Pt., no. 680; Ft. Reliance, no. 681.

***Spergularia salina* J. & C. Presl.** — *S. marina* Griseb. of Gray's Man., 7th ed. — *Tissa salina* (Presl) Greene. — See Rhod. 12: 157 (1910). — Common at the margins of saline flats in the Wood Buffalo Park. A note in Fl. Bor.-Am. under *Arenaria rubra*, and repeated in Macoun's Cat. under *Spergularia media*, "between Cumberland House and Bear Lake," may refer to this species.

***Silene acaulis* L. var. *exscapa* (All.) DC.** — See Rhod. 23: 119–20 (1921). — An arctic species known in our region only on exposed rock crevices about the eastern arm of Great Slave Lake. — Taltheilei Narrows, no. 699; Pike's Portage, *J. W. Tyrrell*, no. 100703(O).

***Silene antirrhina* L.** — Known in the Mackenzie basin east of the mountains only on the north shore of Lake Athabaska where it grows on turfey hillsides. — Chipewyan, no. 7045; Cornwall Bay, nos. 6451, 6563.

***Lychnis Drummondii* (Hook.) Wats.** — *Wahlbergella Drummondii* (Hook.) Rydb. — Occasional in dry prairies in the Wood Buffalo Park, and known elsewhere in our region only on dry calcareous slopes on the north shore of Lake Athabaska. — Charlot Pt., nos. 6090, 6405; Cornwall Bay, nos. 6445, 6561.

NYMPHAEACEAE

***Nymphozanthus variegatus* (Engelm.) Fern.** — *Nymphaea variegata* (Engelm.) G. S. Miller. — See Rhod. 21: 187 (1919). — Common to abundant in shallow lakes, ponds, and sluggish streams throughout our region. Richardson's record in Fl. Bor.-Am., under *Nuphar lutea*, "Wooded country Lat. 54°–64°" probably refers to this species and it is known at Great Bear Lake (*J. M. Bell*, O). — Mamawi Cr., Athabaska delta, no. 2350. Lake Athabaska: Shelter Pt., no. 639; pond just

N. of Cornwall Bay, no. 6614; about 2 mi. W. of Ennuyeuse Cr., no. 7000. Upper Slave R. lowland, no. 2347. Great Slave L.: Fairchild Pt., nos. 637, 638; Belle Isl., Charlton Bay, no. 640; N. W. shore, *Bedford* (O).

CERATOPHYLLACEAE

Ceratophyllum demersum L. — Known in the Mackenzie basin from a single collection in the Wood Buffalo Park. — Slough pond along Murdock Cr., no. 2345.

RANUNCULACEAE

Coptis groenlandica (Oeder) Fern. — See Rhod. 31: 136–42 (1929). — The only Mackenzie basin collections are from Lesser Slave Lake (*Brinkman*, N) and the following. — Thickets on margin of sandy muskeg pond about 5 mi. S. E. of Wolverine Pt., L. Athabaska, no. 6824.

Actaea rubra (Ait.) Willd. — Common in open woods and thickets northward in the Paleozoic and younger country to the Wood Buffalo Park, and known on the Mackenzie (*Onion*, *Kennicott & Hardisty*, N). Apparently occasional in the pre-Cambrian. — Waterways, no. 2402; Calumet, Athabaska R., no. 756; along lower Firebag R., no. 6036. Lake Athabaska: hills south of Wabba L., no. 6485; Cornwall Bay, no. 6502. East shore of L. Mamawi, no. 2390; upper Slave R. lowland, nos. 755, 2394, 2398, 2399; Ft. Smith district, nos. 754, 757.

Aquilegia brevistyla Hook. — Occasional in rather open woods northward to the lower Mackenzie (*Miss E. Taylor*, O) and Great Bear Lake (*Richardson*, O). In the botanical appendix to Back's Narrative is a record for *A. canadensis* var. *hybrida* at "Slave Lake," which probably refers to this species. — Clearwater R., *J. M. Macoun*, no. 1301 (O); McMurray, *J. M. Macoun*, no. 1302 (O); Calumet, Athabaska R., no. 758. Lake Athabaska: Sand Pt., no. 4642; Charlot Pt., nos. 6239, 6276; W. shore of Ellis Bay, no. 6369; Cornwall Bay, no. 6465. Fort Smith, no. 760. Great Slave L.: base of Maufelly Pt., no. 759; Fairchild Pt., no. 761; Windy Pt., *Hume*, no. 102662 (O); Old Ft. Rae, *Russell* (O).

Delphinium scopulorum Gray var. *glaucum* Gray. — Common or occasional in open woods, northward to the Wood Buffalo Park and known on the Mackenzie (*Onion*, N); but apparently confined to the Paleozoic or younger lands. It is sometimes abundant in prairies. — McMurray, no. 7118; upper Slave R. lowland, nos. 2355, 2356; lower Slave R., *Russell*, no. 75 (G); Resolution, *Kennicott* (N).

Anemone parviflora Michx. — Occasional or common in the north-

ern and northeastern parts of our region, where it usually grows in muskegs. Also known on the Mackenzie (*McConnell*, O; *Onion*, N) and at Great Bear Lake (*J. M. Bell*, O). — North shore of L. Athabaska, *J. W. Tyrrell*, no. 100760, in part (O); Ft. Smith, *Miss E. Taylor*, no. 955(O). Great Slave L.: Maufelly Pt., no. 772; Fairchild Pt., no. 771; Pine Pt., *Brooke* (O). Near lower end of Artillery L., *J. W. Tyrrell*, no. 23149(O).

Anemone multifida Poir. var. ***hudsoniana*** DC. — See *Rhod.* 19: 141 (1917). — Common on dry ridges and prairies, and in rock crevices northward to Great Bear Lake (*J. M. Bell*, O) and the Mackenzie (*Dutilly*, G; *Onion*, *Kennicott & Hardisty*, N; *Miss E. Taylor*, O). Most of the material cited below is forma *sanguinea* (Pursh) Fern. — Calumet, Athabaska R., no. 775. Lake Athabaska: Charlot Pt., no. 6233; Cornwall Bay, no. 6441. Upper Slave R. lowland, no. 2417; Ft. Smith, no. 774, and *Miss E. Taylor*, no. 48(O), and *Seton & Preble*, no. 78313 (O). Great Slave L.: Resolution, *Kennicott* (N); Maufelly Pt., no. 773; Fairchild Pt., nos. 776, 777; Windy Pt., *Hume*, no. 102663(O); Old Ft. Rae, *Russell* (O).

Anemone cylindrica Gray. — At least occasional in the more southern districts where it grows in dry woods and prairies, and known also at Peace Point. — *McMurray*, no. 7050.

Anemone Richardsonii Hook. — An arctic and alpine species known in our region only on the north shore of Lake Athabaska. — Lake Athabaska: N. shore, *J. W. Tyrrell*, no. 100760, in part (O); Camsell Portage, no. 6203.

Anemone canadensis L. — Common in the Wood Buffalo Park and southward, growing at slough margins and in prairies, but not known eastward of the Paleozoic boundary. Noted in Fl. Bor.-Am., under *A. pennsylvanica*, "from the United States to near the Mouth of Mackenzie River; not found in the barren grounds"; and in the botanical appendix to Back's Narrative it is reported on "Slave Lake." The writer has seen no material from north of the Wood Buffalo Park. — *McMurray*, *Dutilly*, no. 121(G); Calumet, Athabaska R., no. 770; E. shore of L. Mamawi, nos. 2424, 2426, 4398; upper Slave R. lowland, no. 769.

Pulsatilla ludoviciana (Nutt.) Heller. — *Anemone patens* L. var. *Wolfgangiana* (Bess.) Koch. — Common on dry sandy or rocky ridges and in dry prairies, northward to Great Bear Lake (*J. M. Bell*, O) and the lower Mackenzie (*McConnell*, O; *H. W. Jones*, O; *Kennicott*, N). — Lake Athabaska: Chipewyan, no. 6073; and *J. W. Tyrrell*, no. 100765(O) (*A. patens* var. *Nuttalliana* of Tyrrell's list); Shelter Pt., no. 768; Sand Pt., no. 4669; Charlot Pt., nos. 6089, 6138; Cornwall

Bay, no. 6571. Along Quatre Fourches R., no. 765; Ft. Smith, nos. 766, 2403; and *Seton & Preble*, no. 78314(O). Great Slave L.: base of Maufelly Pt., no. 767; Ft. Reliance, no. 764.

Ranunculus trichophyllus Chaix var. **typicus** Drew. — *R. aquatilis* L. var. *capillaceus* DC., at least in part. — See Rhod. 38: 17-39 (1936). — Common in shallow lakes, ponds, and slow streams, northward at least to Great Slave Lake. Although it is known in the pre-Cambrian about Great Slave Lake it has not been found in similar country on Lake Athabaska. Noted in Fl. Bor.-Am. "to near the Arctic Sea, lat. 68°." — Mamawi Cr., no. 2370; upper Slave R. lowland, no. 729. Great Slave L.: Fairchild Pt., nos. 730, 731, 732; N. W. shore, *Bedford* (O).

Ranunculus Purshii Richards. — Common in slough ponds throughout our region, and known northward to the Mackenzie River (*Onion, Kennicott & Hardisty*, N). Noted at Great Bear Lake in Fl. Bor.-Am. — Calumet, Athabaska R., no. 735. Lake Athabaska: Shelter Pt., nos. 736, 737; Cornwall Bay, nos. 6491, 6626. Upper Slave R. lowland, nos. 734, 2377, 2378, 2379; Smith Portage, Slave R., *Miss E. Taylor*, no. 1109(O). Great Slave L.: Resolution, *Miss E. Taylor*, no. 22(G); N. W. shore, *Bedford* (O).

Ranunculus hyperboreus Rottb. — Known in the Mackenzie basin from a single collection in the Wood Buffalo Park.

Ranunculus reptans L. — Common or occasional on damp sandy or stony lake shores, chiefly in the pre-Cambrian country. Noted in Fl. Bor.-Am., under *R. Flammula* vars., "On gravelly banks of rivers to lat. 69°." — Lake Athabaska: Shelter Pt., nos. 752, 4442; along Charlot R. near its mouth, no. 6362; 5 mi. S. E. of Wolverine Pt., no. 6820; 2 mi. W. of Ennuyeuse Cr., no. 6982. Great Slave L.: Fairchild Pt., nos. 749, 750, 751; N. W. shore, *Bedford* (O).

Ranunculus lapponicus L. — Occasional in muskegs throughout our region and into the Arctic. — Clearwater R., *J. M. Macoun*, no. 1099(O). Lake Athabaska: Shelter Pt., no. 740; N. of Charlot R., no. 6359; hills N. E. of Cornwall Bay, no. 6539; 5 mi. E. of Poplar Pt., nos. 6667, 6701. Great Slave L.: Taltheilei Narrows, no. 738; Fairchild Pt., no. 739. East end of Clinton-Colden L., *J. W. Tyrrell*, no. 23148 (O) (*R. hyperboreus* of Tyrrell's list).

Ranunculus pedatifidus J. E. Sm. — This species is represented in our region mainly by its var. *cardiophyllus*, but the typical form has been found on a rocky hill at the western end of Lake Athabaska. — Chipewyan, no. 6051.

Ranunculus pedatifidus J. E. Sm. var. *cardiophyllus* (Hook.)

Britton. — *R. cardiophyllus* Hook. — See Rhod. 36: 93-6 (1934). — Apparently rare in our region generally, but quite common in small patches of soil on granite hills at the western end of Lake Athabaska. Records in Fl. Bor.-Am. and in the botanical appendix to Back's Narrative under *R. affinis* probably refer to *R. pedatifidus* or some form of it. In the former it is noted as "Universally spread from Canada to the Arctic Sea," and in the latter for "Slave Lake." A note in Back's Narrative under *R. auricomus*, "Thlew-ee-choh and Athabasca," probably also belongs here. — Chipewyan, nos. 4679, 6056, 7037.

Ranunculus rhomboideus Goldie. — A plains species known in our region only on prairies in the Wood Buffalo Park.

Ranunculus abortivus L. — Occasional in muskegs and lowland woods northward at least to the Wood Buffalo Park, but not found thus far east of the Paleozoic boundary.

Ranunculus sceleratus L. — Common on wet pond and lake shores northward in the Paleozoic or younger country at least to the Wood Buffalo Park. Noted by Richardson northward to "Slave Lake and north to Lat. 67°"; and noted on Great Slave Lake both in Back's Narrative and later in Harper's list. — Lower delta of Athabaska R., no. 746; Chipewyan, no. 7033; upper Slave R. lowlands, nos. 745, 2385, 2386; N. W. shore of Great Slave L., *Bedford* (O).

Ranunculus tenellus Nutt. — Known in the Mackenzie basin from a single collection in a flood plain slough along the lower Peace River near the western boundary of the Wood Buffalo Park.

Ranunculus pennsylvanicus Michx. — Apparently occasional northward to the Wood Buffalo Park, growing on wet river banks or on damp lake shores. Scarcely extending east of the Paleozoic boundary. In Fl. Bor.-Am. it is noted as occurring with *R. hispidus* (*R. Macounii*) and "equally diffused," but more recent collections of the two species do not bear this out. — Calumet, Athabaska R., no. 742; lower delta of Athabaska R., no. 744; Shelter Pt., L. Athabaska, no. 743; E. shore of L. Mamawi, no. 2360.

Ranunculus Macounii Britton. — Rather common in damp sloughs northward in the non-crystalline regions at least to the Wood Buffalo Park. Noted in Fl. Bor.-Am., under *R. hispidus*, "Banks of rivers from Canada to near the mouth of the Mackenzie River, lat. 67°," but the writer has seen no material from beyond Fort Simpson (*Onion, Kennicott & Hardisty*, N). — Upper Slave R. lowland, nos. 2363, 2365; Fort Smith, no. 741; N. W. shore of Great Slave L., *Bedford* (O).

RANUNCULUS ACRIS L. — An introduced weed known in our region only about settlements. — Smith Portage Rd., no. 747; Ft. Smith, *Russell*, no. 30(G).

Ranunculus Cymbalaria Pursh. — *Halerpestes Cymbalaria* (Pursh) Greene. — See Rhod. 16: 160 (1914). — Noted in Fl. Bor.-Am., "from Canada to near the Arctic Sea, lat. 68°," but the writer has seen no material from north of the Wood Buffalo Park where it is common on muddy slough and stream margins, particularly those of slightly saline nature. — Upper Slave R. lowlands, no. 2366; Ft. Smith, no. 733.

Thalictrum sparsiflorum Turcz. — Apparently quite rare in the Mackenzie basin and known east of the Rocky Mountains only from the Lesser Slave Lake district (*Brinkman*, N), and in the western uplands of the Wood Buffalo Park. The record in Fl. Bor.-Am. "Found only on Portage La Loche, . . ." is probably referable to this species though the writer has not seen the Richardson material.

Thalictrum venulosum Trel. — Common in prairie openings and open woods northward in the Paleozoic or younger regions at least to the Wood Buffalo Park. The record in Fl. Bor.-Am., "from Canada to the banks of the Mackenzie River, in lat. 67°," under *T. dioicum*, probably refers to this species at least with regard to our region. — Waterways, no. 2435; McMurray, no. 7073; along lower Firebag R., no. 6014?; N. shore of Great Slave L., *Hume*, no. 102664(O).

Caltha palustris L. — Apparently occasional in the timbered lowlands northward to Great Slave Lake, and known on the lower Mackenzie as forma *radicans* (*Miss E. Taylor*, O). — Calumet, Athabaska R., no. 763. Great Slave L.: near Pine Pt., *Brooke* (O); near Big Island, *Onion*, *Kennicott & Hardisty* (N).

PAPAVERACEAE

Corydalis sempervirens (L.) Pers. — *Capnoides sempervirens* (L.) Borkh. — Occasional in rocky places northward to the Mackenzie (*Miss E. Taylor*, O); most frequent in the pre-Cambrian country. — L. Athabaska: Shelter Pt., nos. 785, 786; Sand Pt., nos. 4473, 4531, 4595; Charlot Pt., no. 6088; N. shore of Ellis Bay, no. 6115; N. shore, *J. W. Tyrrell*, no. 2315(O) (*C. glauca* of Tyrrell's list). Along the Quatre Fourches R., no. 783; upper Slave R. lowlands, no. 2443. Great Slave L.: Taltheilei Narrows, no. 784; Yellowknife R., *Russell* (O); S. W. and N. shores, *Howe*, no. 91980(O); N. W. shore, *Bedford* (O).

Corydalis aurea Willd. — *Capnoides aurea* (Willd.) Ktze. — Common in cabin clearings, disturbed soil, and newly burned areas northward to the Mackenzie (*Dutilly*, G; *Onion*, *Kennicott & Hardisty*, N), and Great Bear Lake (*J. M. Bell*, O). — Along lower Firebag R., no. 6033. L. Athabaska: Chipewyan, no. 6052; Shelter Pt., no. 782; N. shore, *J. W. Tyrrell*, no. 1554(O). Upper Slave R. lowland, no. 2441; Ft. Smith, *Seton & Preble*, no. 78315(O) (apparently *C. lutea* of Seton's

list, in part); lower Slave R., no. 781; Resolution, *Kennicott* (N).

CRUCIFERAE

Draba aurea M. Vahl. — See Rhod. 36: 299–302 (1934). — Known in our region only on turf slopes and in rock crevices on the north shore of Lake Athabaska. — Charlot Pt., nos. 6128, 6133, 6274.

Draba glabella Pursh. — *D. hirta* of auth. — See Rhod. 36: 333 (1934). — Known only from two collections in our region, both on Great Slave Lake. — Taltheilei Narrows, no. 810; Yellowknife R., *Russell* (O).

Draba lanceolata Royle. — *D. stylaris* of auth. — See Rhod. 36: 357 (1934). — Occasional in rock crevices and on turf slopes in the pre-Cambrian areas. — L. Athabaska: Charlot Pt., no. 6252; Cornwall Bay, nos. 6457, 6535, 6608. Great Slave L.: Fairchild Pt., nos. 811, 812.

Draba cinerea Adams. — See Svensk Botanisk Tidskrift, 24: 483–6 (1929) and Rhod. 36: 359–60 (1934). — Occasional on dry ridges and ancient beaches in the pre-Cambrian country, and known only from calcareous areas. — L. Athabaska: hills near base of Cornwall Bay, nos. 6536, 6572. Great Slave L.: Fairchild Pt., no. 809.

Draba nemorosa L. — See Rhod. 36: 365 (1934). — Common in dry prairies, clearings, and on sandy lake shores northward at least to the Wood Buffalo Park, mainly in the non-crystalline country. A common weed about settlements. Noted in Fl. Bor.-Am., under *D. lutea*, “from lat. 56° to 66°.” — Waterways, no. 2448; Fond du Lac, L. Athabaska, *J. W. Tyrrell*, no. 2011(O) (var. *leiocarpa* of Tyrrell’s list); Ft. Smith, no. 808; and *Seton & Preble*, no. 78316(O); Resolution, *Kennicott* (N).

THLASPI ARVENSE L. — Occasional as an adventive weed in settled areas. — Waterways, no. 2455; Gov. Hay Camp, Slave R., no. 2454.

Lepidium apetalum Willd. — Occasional in dry prairie openings and disturbed ground northward to the Mackenzie (*Kennicott*, N). Noted in Fl. Bor.-Am., under *L. ruderale*, “from lat. 50° to 68°.” Most American material of this affinity has been called *L. densiflorum* Schrad., but our material matches very well with a fragment of Willdenow’s type in the Gray Herbarium. — Chipewyan, L. Athabaska, no. 7038.

CAPSELLA BURSA-PASTORIS (L.) Medic. — *Bursa Bursa-pastoris* (L.) Britton. — Adventive and very common about settlements. Noted in Fl. Bor.-Am. as far north as Great Bear Lake. — Waterways, no. 2461. L. Athabaska: Camsell Portage, no. 6172; about 3 mi. W. of Ennuyouse Cr. (cabin clearing), no. 6955. Upper Slave R. lowland, no. 2462; Ft. Smith, no. 797.

CAMELLINA SATIVA (L.) Crantz. — Adventive in cabin clearings and settled areas in the Wood Buffalo Park. — Gov. Hay Camp, Slave R., no. 2459.

NESLIA PANICULATA (L.) Desv. — Adventive in cabin clearings and settled districts in the Wood Buffalo Park. — Gov. Hay Camp, Slave R., nos. 2457, 2458.

BRASSICA ARVENSIS (L.) Ktze. — Adventive in settled districts. — Gov. Hay Camp, Slave R., no. 2456.

Sisymbrium salsuginosum Pall. — See Univ. Wyo. Pub. in Bot. 1: 1-27 (1922). — A far northwestern species apparently common or occasional in the Salt Plains west of the upper Slave River, but unknown elsewhere in the Mackenzie basin.

Descurainia sophioides (Fisch.) O. E. Schulz. — An arctic species known in our region only on the northwest shore of Great Slave Lake. — 12 mi. E. of Moraine Pt., *Bedford* (O).

Descurainia Richardsonii (Sweet) O. E. Schultz. — Apparently occasional in clearings and prairies northward to the Mackenzie, chiefly west of the Paleozoic boundary. Part of the Mackenzie basin plants cited in Fl. Bor.-Am., under *Sisymbrium canescens* and *S. brachycarpum*, and possibly also part of those under *S. sophioides*, probably belong here, though the writer has seen none of them. — North shore of McLeod Bay, Great Slave L., no. 813.

Braya humilis (C. A. Mey.) B. L. Robinson. — See Syn. Fl. N. Am. 1: 141 (1895). — An arctic species apparently quite rare in our region, and known only on the northwest shore of Great Slave Lake. There is a record in Tyrrell's list of 1893 for *S. humile* at Chipewyan, but the writer has not been able to find the specimen upon which it was based. — Northwest shore of Great Slave L., *Bedford* (O).

Erysimum cheiranthoides L. — *Cheirinia cheiranthoides* (L.) Link. — Common to abundant in prairies, cabin clearings, and river bank openings northward to the lower Mackenzie (*Miss E. Taylor*, O; *McConnell*, O), and Great Bear Lake (*Richardson*, O), but apparently confined to the country west of the Paleozoic boundary. — East shore of L. Mamawi, no. 2471; Murdock Cr. district, no. 2475; Ft. Smith, no. 799; lower Slave R., no. 798. Great Slave L.: *Onion*, *Kennicott & Hardisty* (N); Hay R., *Hume*, no. 102666(O); N. W. shore, *Bedford* (O).

Erysimum parviflorum Nutt. — Occasional northward to the lower Mackenzie (*McConnell*, O), mainly confined to the Paleozoic or younger areas. In the Wood Buffalo Park it grows on dry prairies and bluffs. — Yellowknife R., Great Slave L., *Russell* (O) (resembles *E. coarctatum* Fern., but has much smaller flowers).

Rorippa obtusa (Nutt.) Britt. — Apparently rare, and known in the Mackenzie basin only from a crevice on a granite hill in the Peace River delta. — East shore of L. Mamawi, no. 2514.

Rorippa palustris (L.) Bess. var. **glabrata** (Lunell) Victorin. — See Jour. Bot. 42: 225 (1924), and Contrib. Lab. Bot. Univ. Montreal, no. 17 (1930). — Common on the wet shores of lakes and sloughs northward to Great Slave Lake, and known on Great Bear Lake (*J. M. Bell*, O). Noted by Richardson, under *Nasturtium palustre*, "to shores of the Arctic Sea." — Calumet, Athabaska R., nos. 801, 802. L. Athabaska: Sand Pt., no. 4548; Camsell Portage, no. 6174; Cornwall Bay, no. 6493. Upper Slave R. lowland, nos. 800, 2506, 2507, 2509. Great Slave L.: Resolution, *Onion, Kennicott & Hardisty* (N); Keith Isl., no. 805; Fairchild Pt., no. 804; Yellowknife Bay, no. 803; N. W. shore, *Bedford* (O); 12 mi. E. of Moraine Pt., *Bedford* (O).

Rorippa palustris (L.) Bess. var. **hispida** (Desv.) Rydb. — Occasional in the Salt Plain region of the Wood Buffalo Park.

Barbarea orthoceras Ledeb. — See Rhod. 11: 134-41 (1909). — Common or occasional on stony and sandy shores about the great lakes, and known also on the Mackenzie (*Richardson*, O). — Lake Athabaska: near Sand Pt., no. 4511; N. shore of Ellis Bay, no. 6123; Crackingstone Pt., *J. W. Tyrrell*, no. 2310(O) (*B. vulgaris* of Tyrrell's list); Fishhook Bay, no. 6580. Great Slave L.: islands, E. arm, nos. 790, 791; Taltheilei Narrows, no. 793; Fairchild Pt., nos. 792, 794, 795; Yellowknife Bay, no. 789; N. W. shore, *Bedford* (O); Ft. Rae, *Russell* (O).

Cardamine pratensis L. var. **palustris** Wimm. & Grab. — See Rhod. 22: 9-11 (1920). — An arctic species known in our region only in the northern and northeastern districts. — Lake Athabaska: N. shore, *J. W. Tyrrell*, no. 2314(O) (*C. pratensis* var. *angustifolia* of *J. M. Macoun's* Contr.). Great Slave L.: Taltheilei Narrows, no. 807; N. W. shore, *Bedford* (O).

Cardamine pennsylvanica Muhl. — Common in upland muskegs and sloughs northward at least to the Wood Buffalo Park, but scarcely extending eastward of the Paleozoic boundary. Noted in Fl. Bor.-Am. "to the shores of the Arctic Sea." — Chipewyan, no. 4701; Shelter Pt., L. Athabaska, no. 806.

Arabis lyrata L. — Common or occasional in upland meadows and on dry ridges or beaches northward to Lake Athabaska and the Wood Buffalo Park. Noted in Fl. Bor.-Am., under *Sisymbrium arabidoides*, north to Lat. 68°. — Clearwater R., *J. M. Macoun*, nos. 1724, 1725(O). Lake Athabaska: Shelter Pt., nos. 787, 788; near Sand Pt., nos. 4555,

4560; mouth of Charlot R., no. 6549; 5 mi. E. of Poplar Pt., no. 6652; near E. end of L. Athabaska, *J. W. Tyrrell*, no. 100741(O).

***Arabis lyrata* L. var. *kamchatica* Fisch.** — This appears to be the common form of the species on sandy beaches and in shore rock crevices about Lake Athabaska. — Charlot Pt., nos. 6132, 6238; shore of main lake just west of Ellis Bay, no. 6266; mouth of Charlot R., no. 6334; 5 mi. E. of Poplar Pt., no. 6684; 2 mi. E. of Wolverine Pt., no. 6706; ancient beach ridges just E. of Wolverine Pt., no. 6748.

***Arabis hirsuta* (L.) Scop.** — Common in dry prairies, clearings, and open woods northward to Lake Athabaska and the Wood Buffalo Park. Also known on the lower Mackenzie (*Onion*, N). — Lake Athabaska: W. shore of Ellis Bay, no. 6162; Charlot Pt., no. 6245; near mouth of Charlot R., no. 6364; hills N. W. of Cornwall Bay, no. 6534. Fort Resolution, *Dutilly*, no. 100(G).

***Arabis retrofracta* Grab.** — *A. Holboellii* of some Amer. auth. — Occasional in dry prairies, open woods and turfy slopes northward to the lower Mackenzie (*Onion*, N). Notes in Fl. Bor.-Am. under *Turritis patula* and *T. retrofracta*, "to lat. 68°," probably all refer to this species. — Lake Athabaska: Shelter Pt., no. 796; Charlot Pt., no. 6081; Cornwall Bay, no. 6446. Fort Smith, *Miss E. Taylor*, no. 1683(O); Windy Pt., Great Slave L., *Hume*, no. 102665(O).

***Arabis divaricarpa* A. Nels.** — *A. brachycarpa* of auth. — Apparently occasional though widespread in our region, and also known from the Mackenzie (*Miss E. Taylor*, O). — Clearwater R., *J. M. Macoun*, no. 1665(O). Lake Athabaska: Chipewyan, nos. 6067, 6068; N. shore of Ellis Bay, no. 6111; Charlot Pt., no. 6139.

***Arabis Drummondii* Gray.** — Occasional in prairies and open woods in the Wood Buffalo Park. The note in Fl. Bor.-Am., under *Turritis glabra*, and in Macoun's Cat. under *A. perfoliata*, "as far north as lat. 64°" may refer to this species.

***Arabis arenicola* (Richards.) Gel.** — Known in our region from a single collection on Lake Athabaska. — North shore of L. Athabaska, *J. W. Tyrrell*, no. 34262(O) (*A. humifusa* var. *pubescens* of Tyrrell's list).

SARRACENIACEAE

***Sarracenia purpurea* L.** — See Barton, 15: 1-6 (1933). — Found growing abundantly in a wet muskeg near the south shore of Lake Athabaska, but otherwise very little known in the Mackenzie basin. Noted in Fl. Bor.-Am. as "probably common throughout Canada, and as far north as Bear Lake." Apparently no Richardson material has ever reached American herbaria, but MacFarlane, in *Das Pflanzenreich*,

4: 110: 34, cited a specimen "Fort Chipewyan (Franklin)," which is probably at least part of the basis for the Richardson record. In his long list of plants observed in 1875 John Macoun includes the pitcher plant in his section iv, "Peace and Athabasca Rivers east of the Rocky Mountains," but no specimens are available to support his record. — Athabaska Lake; muskeg about 3 mi. W. of Ennuyouse Cr., no. 6974.

DROSERACEAE

***Drosera rotundifolia* L.** — Common in wet, mossy muskegs in the pre-Cambrian country about Lake Athabaska but rare or occasional west of the Paleozoic boundary. Noted by Richardson "as far north as the Arctic Circle." — Lake Athabaska: Shelter Pt., nos. 778, 779; Sand Pt., no. 4533; Charlot Pt., no. 6308; muskeg N. E. of Cornwall Bay, no. 6541; 2 mi. W. of Ennuyouse Cr., no. 7010. Great Slave L.: *R. Bell*, no. 23170(O); S. W. and N. shores, *Howe*, no. 91976(O).

***Drosera anglica* L.** — Occasional to common on sandy lake and pond shores about Lake Athabaska, but otherwise unknown in the Mackenzie basin. — Lake Athabaska: Shelter Pt., nos. 780, 4426; Sand Pt., no. 4641; William Pt., no. 6854; about 3 mi. W. of Ennuyouse Cr., no. 6969.

SAXIFRAGACEAE

***Saxifraga Aizoon* Jacq.** — *Chondrosea Aizoon* (Jacq.) Haw. — An arctic species known in our region only on calcareous rocks at the eastern end of Great Slave Lake where it is common in crevices. — Fairchild Pt., nos. 818, 819, 820, 821, 822.

***Saxifraga aizoides* L.** — *Leptasea aizoides* (L.) Haw. — An arctic and alpine species known in the Mackenzie basin east of the mountains only on Great Slave and Great Bear Lakes (*J. M. Bell*, O). — Fairchild Pt., Great Slave L., no. 823.

***Saxifraga tricuspidata* Rottb.** — *Leptasea tricuspidata* (Rottb.) Haw. — Abundant on rock ridges and ancient beaches throughout the pre-Cambrian region and occasional farther westward. Forms with nearly or quite entire leaves are occasional and suggest *S. austromontana* Wiegand. Harper's unverifiable record for the latter species at Chipewyan may have been based upon one of these forms. — Lake Athabaska: Chipewyan, no. 6055; Shelter Pt., nos. 825, 830, 831, 832; Charlot Pt., no. 6105; near mouth of Charlot R., no. 6335; 5 mi. E. of Poplar Pt., no. 6643. Along the Quatre Fourches R., no. 826; E. shore of L. Mamawi, no. 2568; upper Slave R. lowland, no. 2567. Great Slave L.: Resolution, *Kennicott* (N); Caribou Isl., *Seton & Preble*, no. 78329(O); Taltheilei Narrows, no. 827; Maufelly Pt., no. 824; Fair-

child Pt., nos. 828, 829; Ft. Reliance, nos. 833, 834; S. W. and N. shores, *Howe*, no. 91970(O); Windy Pt., *Hume*, no. 102667(O); N. W. shore, *Bedford* (O); Yellowknife R., *Russell* (O). Parry's Falls, Lockhart R., *J. W. Tyrrell*, no. 23166(O); Artillery L., *J. W. Tyrrell*, no. 23167(O); and *Seton & Preble*, no. 78330(O).

Heuchera Richardsonii R. Br. — See *Rhod.* 35: 111–19 (1933). — Common on dry bluffs, prairies, and rocky hills northward at least to the Wood Buffalo Park, and known on the upper Mackenzie (*Dutilly*, G). Noted by Richardson from “lat. 54°–64°.” Scarcely extending into the pre-Cambrian country. — Lake Athabaska: Shelter Pt., no. 848; near Sand Pt., no. 4635. E. shore of L. Mamawi, no. 2550; along Quatre Fourches R., no. 847.

Mitella nuda L. — Common in rich spruce or spruce-poplar woodlands and timbered muskegs northward to the Mackenzie (*Onion, Kennicott & Hardisty*, N), but apparently occasional east of the Paleozoic boundary. — Calumet, Athabaska R., no. 816; along the lower Firebag R., no. 6038. Lake Athabaska: Shelter Pt., no. 817; Charlot Pt., no. 6302. Upper Slave R. lowland, nos. 815, 2562; vicinity of Ft. Smith, *Miss E. Taylor*, no. 21(G, O).

Chrysosplenium tetrandrum Fries. — An arctic and subarctic species occasional throughout most of our region, usually growing in muskegs. — Taltheilei Narrows, Great Slave L., no. 814.

Parnassia multiseta (Ledeb.) Fern. — *P. palustris* of auth. — See *Rhod.* 28: 211 (1926). — Common in muskegs, willow slough margins, and on wet lake shores throughout our region, and known northward to the lower Mackenzie (*Stringer*, O), and Great Bear Lake (*J. M. Bell*, O). — Lake Athabaska: Shelter Pt., nos. 840, 841, 4422; near Sand Pt., no. 4630. Upper Slave R. lowland, nos. 2553, 2554; along Smith Portage Rd., no. 842; Slave R., *Miss E. Taylor*, no. 25(G). Great Slave L.: *R. Bell*, no. 23164(O); Fairchild Pt., nos. 843, 844, 845; Yellowknife Bay, no. 846; S. W. and N. shores, *Howe*, no. 91969(O); N. W. shore, *Bedford* (O).

Parnassia montanensis Fern. & Rydb. — Occasional on slough margins and wet lake shores in our region, but scarcely known elsewhere in the Mackenzie basin outside the mountains. — Calumet, Athabaska R., no. 838; Shelter Pt., L. Athabaska, no. 837; Fairchild Pt., Great Slave L., no. 839.

Parnassia Kotzebuei Cham. & Schl. — A northwestern arctic species known only in the pre-Cambrian parts of our region. It grows on stony shores. — Axis Lake, near the east end of L. Athabaska, *Campbell*, no. 132437(O). Great Slave L.: Taltheilei Narrows, no. 836; Fairchild Pt., no. 835.

Ribes oxyacanthoides L. — *Grossularia oxyacanthoides* (L.) Mill. — Common on rocky hills and in prairies and open woods northward at least to Great Slave Lake. — Lac la Biche, no. 6007; Waterways, no. 2531; along lower Firebag R., no. 6024. Lake Athabaska: Shelter Pt., nos. 855, 856; near Sand Pt., no. 4521; Charlot Pt., nos. 6140, 6281; Cornwall Bay, no. 6605; near Fond du Lac, *J. W. Tyrrell*, no. 8687(O). East shore L. Mamawi, no. 2537; upper Slave R. lowland, nos. 852, 2542; Ft. Smith, *Seton & Preble*, no. 78578(O) (*R. setosum* of Seton's list); lower Slave R., no. 854. Great Slave L.: Resolution, *Kennicott* (N); Fairchild Pt., nos. 850, 853.

Ribes hudsonianum Richards. — Common in rich woods and timbered muskegs northward to Great Slave Lake, and at least occasional at Great Bear Lake (*J. M. Bell*, O), and on the Mackenzie (*Kennicott*, N). — Calumet, Athabaska R., no. 864; along lower Firebag R., nos. 6013, 6023, 6034a. Lake Athabaska: Chipewyan, *J. W. Tyrrell*, no. 100833(O); Shelter Pt., nos. 861, 863; Charlot Pt., no. 6157; 5 mi. E. of Poplar Pt., no. 6693. Along the Quatre Fourches R., no. 860; upper Slave R. lowland, nos. 859, 862, 2525; Ft. Smith, *Miss E. Taylor* (G, O); and *Seton & Preble*, no. 78326(O). Great Slave L.: Resolution, *Onion, Kennicott & Hardisty* (N); Caribou Isl., *Seton & Preble*, no. 78327(O); Fairchild Pt., no. 865; Yellowknife Bay, no. 858; S. W. shore, *Brooke* (O); N. W. shore, *Bedford* (O) ?. Crystal Isl., Artillery L., *J. W. Tyrrell*, no. 100834(O).

Ribes lacustre (Pers.) Poir. — *Limnobotrya lacustris* (Pers.) Rydb. — Occasional in rich woods and timbered muskegs northward in the Paleozoic or younger country to the Wood Buffalo Park. Eastward in the pre-Cambrian country it has been found only in a calcareous district on Lake Athabaska. Noted in Fl. Bor.-Am., "Throughout Canada to Fort Franklin and Bear Lake . . ." — Hills near base of Cornwall Bay, L. Athabaska, nos. 6428, 6566.

Ribes glandulosum Grauer. — *R. prostratum* L'Hér. — Occasional in woods and thickets. Noted by Preble "throughout the country from the Athabaska north at least to Great Bear Lake," but the writer has seen no material from beyond the south shore of Great Slave Lake. — Lake Athabaska: Shelter Pt., no. 849; Charlot Pt., no. 6160. Clut L., near the east end of L. Athabaska, *Campbell*, nos. 132439, 132440. Slave R., *Miss E. Taylor*, no. 8666(O); Ft. Resolution, *Kennicott* (N).

Ribes triste Pall. — Common in rich woods and timbered muskegs throughout the region and extending to the lower Mackenzie (*Kennicott*, N; *McConnell*, O). — McMurray, no. 866; along Athabaska R. about 15 mi. below McMurray, no. 868; Calumet, Athabaska R., no. 867;

along lower Firebag R., nos. 6011, 6021. Lake Athabaska: Chipewyan, *J. W. Tyrrell*, no. 85012(O) (*R. rubrum* of Tyrrell's list); Charlot Pt., no. 6149; Camsell Portage, no. 6189; Fishhook Bay, no. 6579; near mouth of Archibald R., no. 6758. Ft. Smith, *Seton & Preble*, no. 78328(O). Great Slave L.: Fairchild Pt., no. 870.

ROSACEAE

Sorbus sitchensis Roem. — Primarily a cordilleran species, but known eastward in the Lesser Slave Lake district (*John Macoun*, O) and on Lake Athabaska. In the latter region it is occasional on beach ridges about the north shore, and abundant in similar places on the south shore. — Lake Athabaska: Sand Pt., nos. 4470, 4584, 4659; Elliot Pt., no. 6425; about 3 mi. E. of Wolverine Pt., no. 6799; 2 mi. W. of Ennuyeuse Cr., no. 6930.

Amelanchier florida Lindl. — See *Rhod.* 14: 117 (1912). — A common shrub of dry woods, prairies, river banks, and rocky hills northward at least to the Wood Buffalo Park. Noted by Preble as extending "nearly to the limit of the woods," and Richardson noted it (as *A. ovalis*) "to the Saskatchewan and Mackenzie Rivers." It is a variable species with forms in our region strongly suggesting *A. humilis* Wieg. — Athabaska R., "near the rapids," *Miss E. Taylor*, no. 8289 (O); Waterways, no. 2649; Calumet, no. 932. Lake Athabaska: Chipewyan, no. 6065; Shelter Pt., nos. 929, 933, 4466; near Sand Pt., no. 4519; N. W. angle of *L. Athabaska*, *J. W. Tyrrell*, no. 100894(O) (*A. alnifolia* of Tyrrell's list); Charlot Pt., no. 6084; Fishhook Bay, no. 6588; 5 mi. E. of Poplar Pt., no. 6670; 2 mi. W. of Ennuyeuse Cr., nos. 6931, 6933. East shore of L. Mamawi, no. 2654; along Quatre Fourches R., no. 927; upper Slave R. lowland, nos. 928, 2652; Ft. Smith, no. 930; and *Seton & Preble*, no. 78587(O) (*A. alnifolia* of Seton's list); Resolution, *Kennicott* (N). Numbers 4466 and 4519 cited above approach *A. humilis*. In Wiegand's revision of this group he doubtfully determines the Taylor specimen and also one from Resolution collected by Preble (N. E.) as *A. humilis*.

Amelanchier humilis Wieg. — Occasional on sandy lake and pond margins about Lake Athabaska, and apparently commoner southward in the Athabaska River valley. Otherwise unknown in the Mackenzie basin except for the doubtfully determined Preble specimen noted under *A. florida*. — McMurray, nos. 7078, 7089; along lower Firebag R., no. 6043. Lake Athabaska: Sand Pt., no. 4515; 5 mi. S. E. of Wolverine Pt., no. 6829.

Rubus idaeus L. var. ***canadensis*** Richards. — *R. subarcticus* (Greene) Rydb. — See *Rhod.* 21: 89 (1919). — The common red

raspberry of open woods, clearings, prairies, rocky hills, and lake beaches. Preble's note under *R. strigosus*, "nearly throughout the forested region," probably refers to this variety for the most part. Tyrrell's record under the same name on Stone River east of Lake Athabaska, and Harper's under *R. melanolasius* between Athabaska and Great Slave Lakes may also belong here. — McMurray, no. 7104. Lake Athabaska: Shelter Pt., nos. 883, 884, 888, 889; Sand Pt., nos. 4520, 4522; N. shore of Ellis Bay, no. 6119; Cornwall Bay, no. 6567; 5 mi. E. of Poplar Pt., no. 6641. East shore of L. Mamawi, no. 2635; upper Slave R. lowland, nos. 881, 887, 2627; Ft. Smith, no. 885; lower Slave R., no. 882. Great Slave L.: Caribou Isl., *Seton & Preble*, no. 78324(O) (*R. strigosus* of Seton's list); Fairchild Pt., no. 886; Ft. Rae, *Russell* (O).

Rubus idaeus var. **strigosus** (Michx.) Maxim. — See Rhod. 21: 89 (1919). — Known in our region only in the Wood Buffalo Park, but apparently occasional northward to the lower Mackenzie (*Onion*, N; *Miss E. Taylor*, O).

Rubus Chamaemorus L. — Widely distributed in muskegs, but commonest about Great Slave Lake and in the pre-Cambrian country southward. — Lake Athabaska: Shelter Pt., nos. 891, 893; Sand Pt., no. 4600; Camsell Portage, no. 6195; hill country about 4 mi. S. E. of Wolverine Pt., no. 6788. Great Slave L.: Resolution, *Kennicott* (N); and *Miss E. Taylor* (G, N, O); Taltheilei Narrows, no. 892; Fairchild Pt., no. 890; Yellowknife Bay, no. 895; S. W. and N. shores, *Howe*, no. 91975(O); mouth of Little Buffalo R., *Brooke* (O); 12 mi. E. of Moraine Pt., *Bedford* (O); near Ft. Rae, *Russell* (O). Artillery L., *J. W. Tyrrell*, no. 23165(O).

Rubus pubescens Raf. — *R. triflorus* Richards. — See Rhod. 11: 236 (1909). — Common to abundant in shady woods northward to Lake Athabaska and the Wood Buffalo Park, and known also on the Mackenzie (*Kennicott*, N; *Onion*, N). — Calumet, Athabaska R., no. 879; along lower Firebag R., no. 6047. Lake Athabaska: Camsell Portage, no. 6201; Cornwall Bay, no. 6501; along Archibald R., near its mouth, no. 6761. Along the Quatre Fourches R., no. 880; Gov. Hay Camp, Slave R., no. 2619.

Rubus acaulis Michx. — *R. arcticus* L. var. *grandiflorus* Hook. — Common to abundant in rich woods and muskeg thickets northward to Great Bear Lake (*J. M. Bell*, O) and the Mackenzie (*Kennicott*, N). — Lower Athabaska R., *Kennicott* (N). Lake Athabaska: N. shore, *J. W. Tyrrell*, no. 5776(O); Shelter Pt., nos. 872, 875; Camsell Portage, no. 6197. Upper Slave R. lowland, nos. 871, 873, 2638, 2639; vicinity of

Ft. Smith, *Miss E. Taylor* (G, O); lower Slave R., *Brooke* (O). Great Slave L.: Resolution, *Kennicott* (N); Taltheilei Narrows, nos. 874, 878; Fairchild Pt., no. 877; Yellowknife Bay, no. 876; S. W. and N. shores, *Howe*, no. 91974(O); N. W. shore, *Bedford* (O).

Fragaria glauca (S. Wats.) Rydb. — Common to abundant in dry open woods, prairies, clearings, and on rocky hills northward to Lake Athabaska and the Wood Buffalo Park; at least occasional at Great Bear Lake (*J. M. Bell*, O) and on the Mackenzie (*Onion*, N). Citations in Fl. Bor.-Am. of Mackenzie basin plants under *F. virginiana* and *F. canadensis* probably belong here, as well as Harper's record for *F. cuneifolia* at Grand Rapids on the Athabaska. Rydberg named several of the specimens cited below as *F. pauciflora*, but the writer has been unable to draw any good distinctions between this species and *F. glauca*, if indeed the latter can be maintained entirely separate from the widespread *F. virginiana*. — Lower Athabaska R., *Kennicott* (N); along the Athabaska just below MacKay, no. 6004; Calumet, nos. 971, 972; along lower Firebag R., no. 6046. Lake Athabaska: Chipewyan, no. 6059; Cornwall Bay, no. 6439; Black R., *J. W. Tyrrell*, no. 7168(O) (*F. canadensis* of Tyrrell's list). East shore of L. Mamawi, no. 2609; along the Quatre Fourches R., no. 974; upper Slave R. lowland, nos. 970, 2606; Ft. Smith, no. 969; and *Miss E. Taylor*, no. 7169(O); and *Seton & Preble*, no. 78574(O).

Fragaria vesca L. var. ***americana*** Porter. — Known in our region only in the southern districts and along the Peace River in the Wood Buffalo Park. — Waterways, no. 2610.

Potentilla arguta Pursh. — *Drymocallis agrimonioides* (Pursh) Rydb. — Noted in Fl. Bor.-Am. in the "woody country as far north as lat. 65°" but the writer has seen no material from beyond Lake Athabaska and the Wood Buffalo Park where it is common in dry prairies and rock crevices. Harper's record for *Drymocallis corymbosa* on the "Taltson River below Napie Falls" probably belongs here. — McMurray, no. 7092; Calumet, Athabaska R., no. 948. Lake Athabaska: Chipewyan, no. 4703; Shelter Pt., nos. 949, 4430; Charlot Pt., no. 6261; Cornwall Bay, no. 6437. East shore of L. Mamawi, no. 2690.

Potentilla millegrana Engelm. — Known in our area only from a clearing along the upper Slave River. — Government Hay Camp, no. 2681.

Potentilla norvegica L. var. ***hirsuta*** (Michx.) Lehm. — *P. monspeliensis* of auth. — See Bibl. Bot. 16: 404 (1908). — Common to abundant in wet meadows, prairies, and areas of disturbed soil generally, whether natural or artificial, northward at least to Great Slave

Lake. Noted in Fl. Bor.-Am. at Great Bear Lake. — Lower delta of Athabaska R., no. 963. Lake Athabaska: Chipewyan, no. 7034; Shelter Pt., nos. 964, 965; Sand Pt., no. 4544; Camsell Portage, no. 6173; Charlot Pt., no. 6246; Cornwall Bay, nos. 6433, 6450; 3 mi. W. of Ennuyeuse Cr., no. 6959. East shore of L. Mamawi, no. 2692; upper Slave R. lowland, nos. 2698, 2699, 2701; Ft. Smith, no. 966. Great Slave L.: Keith Isl., no. 968; Yellowknife Bay, no. 967; S. W. and N. shores, *Howe*, no. 91973(O).

Potentilla nivea L. — An arctic species known in our region only in the pre-Cambrian country where it inhabits crevices in exposed rocky hills. — Lake Athabaska: Chipewyan, no. 4675; Charlot Pt., nos. 6087, 6094. Parry Falls, Lockhart R., *J. W. Tyrrell*, no. 23160(O); Artillery L., *J. W. Tyrrell*, no. 23159(O).

Potentilla nivea L. var. **subquinata** Lange. — *P. nipharga* Rydb. — Occasional in rock crevices and on stony beaches about Athabaska and Great Slave Lakes, and known on the lower Mackenzie (*Onion*, N, type of *P. nipharga*). — Lake Athabaska: Chipewyan, no. 6057; Sand Pt., no. 4530; hills N. and N. E. of Cornwall Bay, nos. 6525, 6576. Great Slave L.: island in E. arm, no. 939; Talttheilei Narrows, no. 941; Fairchild Pt., no. 940; Yellowknife R., *Russell* (O).

Potentilla nivea L. var. **pentaphylla** Lehm. — *P. quinquefolia* Rydb. — Apparently rare or occasional in the pre-Cambrian country about Great Slave Lake where it grows in rock crevices. — Caribou Isl., *Seton & Preble*, nos. 78575, 78576(O); Talttheilei Narrows, no. 938.

Potentilla multifida L. — Common on shore rocks on the north side of Lake Athabaska, and at least occasional at Great Slave Lake and on the Mackenzie (*Dutilly*, G; *Miss E. Taylor*, O). — Lake Athabaska: Chipewyan, nos. 6061, 7036; Shelter Pt., nos. 936, 4464; Charlot Pt., nos. 6130, 6237; Fishhook Bay, no. 6578. Ft. Smith, *Seton & Preble* (N, O); Yellowknife Bay, Great Slave L., no. 935.

Potentilla pulcherrima Lehm. — A northern plains species known in our region only in dry prairies in the Wood Buffalo Park.

Potentilla pennsylvanica L. — See *Rhod.* 37: 286–92 (1935). — Common or occasional on dry prairies, sandy ridges, and rocky hills northward at least to Lake Athabaska and the Wood Buffalo Park. Known also at Great Slave Lake and noted by Richardson at Bear Lake. — Lake Athabaska: Chipewyan, no. 7022; Shelter Pt., no. 934; near Wabba L., no. 6476; Cornwall Bay, no. 6559. East shore of L. Mamawi, nos. 2718, 2719. Resolution, *Onion*, *Kennicott & Hardisty* (N). Taltson R., below Tethul R., *Harper*, no. 100280(O) (*P. glabrella* of Harper's list. This specimen is labeled "Rocher River, Alberta

... Aug. 12, 1914," but the published note refers to the Taltson River with the same date, and it is presumed that the latter is correct.)

Potentilla pectinata Raf. — Known in the Mackenzie basin only in the pre-Cambrian parts of our region where it inhabits rock crevices. — Lake Athabaska: Chipewyan, no. 7035; near Sand Pt., nos. 4487, 4636; Charlot Pt., nos. 6240, 6381; Cornwall Bay, no. 6548; Fishhook Bay, no. 6582. Talttheilei Narrows, Great Slave L., no. 937.

Potentilla Anserina L. — *Argentina Anserina* (L.) Rydb. — Abundant in damp meadows, the drier parts of slough margins, and on some river and lake shores northward to Great Slave Lake, but scarcely extending into the pre-Cambrian country. Known on the Mackenzie (*Onion*, N; *Miss E. Taylor*, G, O), and noted by Richardson "to the extreme Arctic regions." — Calumet, Athabaska R., no. 945; Shelter Pt., L. Athabaska, no. 942; E. shore of L. Mamawi, no. 2682; upper Slave R. lowland, nos. 944, 946, 2683; Ft. Smith, no. 943. Great Slave L.: Resolution, *Miss E. Taylor*, no. 100931(O); Stony Isl., *J. W. Tyrrell*, no. 23161(O); Keith Isl., no. 947; Hay R., *Hume*, no. 102668(O).

Potentilla palustris (L.) Scop. — *Comarum palustre* L. — Common at the margins of sloughs and muskeg ponds throughout the region to Great Bear Lake (*J. M. Bell*, O) and the Barren Lands. — Lower Athabaska R., *Kennicott* (N); Egg L., Athabaska delta, *Harper*, no. 45(G). Lake Athabaska: Shelter Pt., nos. 954, 955; Sand Pt., no. 4579; mouth of Charlot R., no. 6313; Cornwall Bay, no. 6625; William Pt., no. 6845; muskeg 3 mi. W. of Ennuyeuse Cr., no. 6963; pond shore about 2 mi. W. of Ennuyeuse Cr., no. 6985. Great Slave L.: N. shore of McLeod Bay, no. 957; Fairchild Pt., nos. 956, 958, 959; Yellowknife Bay, no. 953; Ft. Rae, *Russell* (O). Casba L., *J. W. Tyrrell*, no. 23161(O).

Potentilla fruticosa L. — *Dasiphora fruticosa* (L.) Rydb. — A common shrub of muskegs and rock crevices in the Wood Buffalo Park and about Great Slave Lake, but not known thus far on Lake Athabaska. Tyrrell noted it near Fond du Lac, but no specimen is available. Preble gives its northern range as "to the limit of the forest," and it has been collected at Great Bear Lake (*J. M. Bell*, O) and on the lower Mackenzie (*Onion*, N). Ft. Smith, no. 961. Great Slave L.: Caribou Isl., *Seton & Preble*, no. 78323(O); Talttheilei Narrows, no. 962; Yellowknife Bay, no. 960; S. W. and N. shores, *Howe*, no. 91972(O); N. W. shore, *Bedford* (O); Ft. Rae, *Russell* (O); Great Slave L., *R. Bell*, no. 23158(O); and *Kennicott* (N).

Potentilla tridentata Ait. — *Sibbaldiopsis tridentata* (Ait.) Rydb. — Noted by Richardson "throughout the woody country, . . .

as far as lat. 64° ," but otherwise not known north of Lake Athabaska and the Wood Buffalo Park. It grows on dry sandy ridges and dunes, sandy lake beaches and in rock crevices. — Lower Athabaska R., *Kennicott* (N). Lake Athabaska: Shelter Pt., nos. 950, 951, 952, 4429; near Sand Pt., no. 4538; rocky point at N. W. entrance to Black Bay, no. 6418; dunes about 2 mi. E. of Wolverine Pt., no. 6749; sand hills about 4 mi. S. E. of Wolverine Pt., no. 6780; dunes just E. of Ennuyeuse Cr., no. 6926. Woodcock Portage, Black R., *J. W. Tyrrell*, no. 8030 (O). Upper Slave R. lowland (Gov. Hay Camp district), no. 2729.

Chamaerhodos Nuttallii Pickering. — See *Rhod.* 37: 284–5 (1935). — Known in the Mackenzie basin east of the Rocky Mountains only from a single locality on the north shore of Lake Athabaska where it is abundant on outcrops of conglomerate rocks. — *Charlot Pt.*, nos. 6228, 6248.

Geum macrophyllum Willd. var. **perincisum** (Rydb.) Raup. — *G. perincisum* Rydb. — *G. oregonense* Rydb., not Scheutz. — See *Rhod.* 33: 172–6 (1931). — Common in prairies and sloughs northward to Great Bear Lake (*J. M. Bell*, O) and the Mackenzie (*Onion*, *Kennicott & Hardisty*, N), but not thus far collected in the pre-Cambrian regions. — Upper Slave R. lowland, nos. 923, 2589, 2591; Ft. Smith district, nos. 922, 925, 926; lower Slave R., no. 924.

Geum strictum Ait. — Common in dry prairies and occasional in cabin clearings northward to the Wood Buffalo Park, and known also on the Mackenzie (*Miss E. Taylor*, O). — *McMurray*, no. 7094; E. shore of L. Mamawi, no. 2579.

Geum triflorum Pursh. — *Sieversia triflora* (Pursh) R. Br. — Common in dry upland prairies and rocky hills in the Wood Buffalo Park and southwestward. The Richardson plant probably came from the vicinity of Chipewyan, but there is no other record for the species in the pre-Cambrian. — Lake Athabaska, *Richardson* (O); Gov. Hay Camp district, Slave R., no. 2587.

Dryas Drummondii Richards. — Known in our region about Great Slave Lake and on the north shore of Lake Athabaska, and apparently confined to calcareous rocks. Known on the Mackenzie (*Onion*, N), and given a wide range in the northwestern arctic regions by Richardson. — Lake Athabaska: Cornwall Bay, no. 6550. Great Slave L.: Resolution, *Kennicott* (N); Fairchild Pt., nos. 911, 912, 913, 914; Jones Pt., *Hume*, no. 102669(O); N. W. shore, *Bedford* (O).

Dryas integrifolia Vahl. — An arctic and alpine species common about Great Slave Lake and northward. — Great Slave L.: *R. Bell*, no. 23156(O); Caribou Islands, *Seton & Preble*, no. 78322(O); Taltheilei

Narrows, nos. 915, 917, 919; Fairchild Pt., nos. 916, 918, 920, 921; S. W. and N. shores, *Howe*, no. 91971(O); N. W. shore, *Bedford* (O). Last woods, Artillery L., *Seton & Preble*, no. 78321(O); barren ground, Artillery L., *J. W. Tyrrell*, no. 23157(O).

***Rosa acicularis* Lindl.** — An abundant and exceedingly variable species throughout the wooded country. The writer has been unable to maintain var. *Bourgeauiana*, although this is commonly done with many northern specimens; the shape of the fruits is extremely variable, both with age and locality, and the only trend which seems worthy of note is to be found about Lake Athabaska and southward. Here a form with much elongated fruits has been collected several times (nos. 2658, 2659, 2660, 4456, 4415, 7113, cited below), and may be referable to var. *lacorum* Erlanson (See Papers Mich. Acad. Sci., Arts and Letters, 5: 77-94). Most of the material cited in Fl. Bor.-Am. for the Mackenzie basin under *R. blanda*, *R. Sayii*, and *R. majalis* probably belongs here. — McMurray, nos. 7113, 7114; Calumet, Athabaska R., nos. 903, 910; Reed Portage, upper Athabaska delta, no. 2660; lower Athabaska R., *Kennicott* N). Lake Athabaska: Shelter Pt., nos. 898, 899, 907, 908, 4445, 4446; Sand Pt., nos. 4651, 4680; N. shore of Ellis Bay, no. 6121; Charlot Pt., no. 6403; hills S. of Wabba L., no. 6478; 2 mi. E. of Wolverine Pt., no. 6708; mouth of Archibald R., no. 6768; sand hills 4 mi. S. E. of Wolverine Pt., no. 6774; William Pt., no. 6855; 2 mi. W. of Ennuyeuse Cr., nos. 6950, 6951, 7006. East shore of L. Mamawi, nos. 2658, 2659, 2667, 4415; along Quatre Fourches R., no. 905; upper Slave R. lowland, nos. 906, 2674; Fitzgerald, *R. M. Anderson* (N); Ft. Smith, no. 901; and *Seton & Preble*, no. 78325(O). Great Slave L.: Stony Isl., *J. W. Tyrrell*, no. 23162(O); Talttheilei Narrows, no. 897; Maufelly Pt., no. 904; Fairchild Pt., nos. 896, 900, 909; Yellowknife Bay, no. 902; 12 mi. E. of Moraine Pt., *Bedford* (O); near Ft. Rae, *Russell* (O).

***Rosa Woodsii* Lindl.** — Common on dry prairies and bluffs in the southern and southwestern parts of the Mackenzie basin, but not definitely known in any part of the pre-Cambrian country or north of the Wood Buffalo Park. Noted in Fl. Bor.-Am. "North of the Saskatchewan, as far as Bear Lake." — McMurray, nos. 7059, 7091; E. shore of L. Mamawi, nos. 2680, 4416.

***Prunus demissa* (Nutt.) D. Dietr.** — Common in the southern and southwestern parts of the Mackenzie basin, in upland woods and on dry river bluffs. Notes in Fl. Bor.-Am. under *Cerasus virginiana* and *C. serotina* probably refer to this species and give the northern limit at Great Slave Lake, lat. 62°. The writer has seen no material, however,

from beyond the lower Athabaska, and it should be noted that both Seton and Preble place the northern limit in this district also. — Waterways, no. 2569; McMurray, no. 7082; along Athabaska R. just below MacKay, no. 6000.

***Prunus pennsylvanica* L.f.** — Common in the southern and southwestern portions of the Mackenzie basin and northward to Lake Athabaska and the Wood Buffalo Park. Preble recorded it at Great Slave Lake when he wrote, "along the Athabaska and Slave Rivers and about the great lakes into which they flow." — Waterways, no. 2573; along Athabaska R. just below MacKay, no. 6002; along lower Firebag R., no. 6042. Lake Athabaska: Shelter Pt., nos. 975, 976, 4443; Sand Pt., nos. 4469, 4594; N. shore of Ellis Bay, no. 6122; Charlot Pt., no. 6216; Fishhook Bay, no. 6581; 2 mi. E. of Wolverine Pt., no. 6712; sand hills 4 mi. S. E. of Wolverine Pt., no. 6775; 2 mi. W. of Ennuyeuse Cr., no. 6946. Upper Slave R. lowland, no. 2572.

LEGUMINOSAE

***Astragalus frigidus* (L.) Gray var. *americanus* (Hook.) Wats.** — ***Phaca americana* (Hook.) Rydb.** — Common or occasional about Great Slave Lake and in the Wood Buffalo Park but not known elsewhere in our region. It is also known on the upper Mackenzie (*Dutilly*, G). — Great Slave L.: base of Maufelly Pt., no. 992; Fairchild Pt., no. 993.

***Astragalus canadensis* L.** — Known in the Mackenzie basin from a single collection along the lower Athabaska River. — River bank, McMurray, no. 7049.

***Astragalus adsurgens* Pall.** — Occasional on sandy ridges and prairies in the Wood Buffalo Park and southwestward.

***Astragalus hypoglottis* L.** — Common in rather dry prairies in the Wood Buffalo Park and southwestward.

***Astragalus alpinus* L.** — ***Tium alpinum* (L.) Rydb.** — Rather common in upland woods and prairies northward at least to Lake Athabaska and the Wood Buffalo Park. Known also at Great Bear Lake (*J. M. Bell*, O) and the Mackenzie (*Onion*, N). — Lake Athabaska: island on N. shore about 6 mi. E. of Chipewyan, no. 4672; Cornwall Bay, nos. 6440, 6565, 6610. Ft. Smith, nos. 994 (coll. *Mrs. Conibear*), 995.

***Astragalus neglectus* (T. & G.) Sheldon.** — Known in the Mackenzie basin from a single collection on the lower Athabaska River. — River bank, McMurray, no. 7056.

***Astragalus eucosmus* Robinson.** — Apparently rare or occasional, but of wide range in the Mackenzie basin, extending northward to Great

Bear Lake (*J. M. Bell*, O). — Dolomitic hill near base of Cornwall Bay, L. Athabaska, no. 6574; island in Slave R. (at 30th base line), no. 991.

Astragalus tenellus Pursh. — *Homalobus tenellus* (Pursh) Britton. — Apparently occasional on dry banks and prairies northward to the lower Mackenzie (*Richardson*, O; *Miss E. Taylor*, O), but not known east of the Paleozoic boundary.

Astragalus yukonis Jones. — Known in the Mackenzie basin from a single collection on the lower Athabaska River. — River bank, Calumet, no. 990.

Oxytropis retrorsa Fern. — See *Rhod.* 30: 140–1 (1928). — Known in our region from a single collection near the lower Athabaska River. — Along woods road near McMurray, no. 7096.

Oxytropis hudsonica (Greene) Fern. — See *Rhod.* 30: 142 (1928). — An arctic species known in our region only in the Lockhart basin. — Barren grounds, Artillery L., *J. W. Tyrrell*, no. 23150(O) (*O. campestris* var. *caerulea* of Tyrrell's list).

Oxytropis gracilis (A. Nels.) K. Schum. — *Aragallus gracilis* A. Nels. — See Univ. Wyo. Publ. Bot. 1: 109–21 (1926) for a treatment of this and the following. — Apparently occasional in the northwestern part of our region, and known on the lower Mackenzie (*Miss E. Taylor*, O). — N. W. shore of Great Slave L., *Bedford* (O).

Oxytropis Lamberti Pursh. — Apparently rare or occasional and known in the Mackenzie basin only on Great Slave Lake. Harper's record for this species at "Salt River, September 8" cannot be verified. — S. W. and N. shores of Great Slave L., *Howe*, nos. 91977, 91978(O).

Oxytropis viscidula (Rydb.) Tidestr. — *Aragallus viscidulus* Rydb. — Known thus far in the Mackenzie basin east of the mountains only on Great Slave Lake where it grows on shingle beaches. — Fairchild Pt., nos. 980, 981, 982; N. W. shore, *Bedford* (O).

Oxytropis splendens Dougl. — *Aragallus splendens* (Dougl.) Greene. — Common in dry upland prairies and on sandy ridges and plains, chiefly west of the Paleozoic boundary and northward at least to Great Slave Lake. Noted by Richardson as extending to Bear Lake. The writer has included var. *Richardsonii* which seems of doubtful value. — Calumet, Athabaska R., no. 979. Great Slave L.: Resolution, *Onion*, *Kennicott & Hardisty* (N); Ft. Reliance, no. 978; first point N. of Gypsum Pt., *Hume*, no. 102671(O).

Glycyrrhiza lepidota (Nutt.) Pursh. — John Macoun noted this species as occurring northward to Lake Athabaska, but the only authentic record for the Mackenzie basin is from specimens collected on the

lower Athabaska River in 1935. — River bank near McMurray, no. 7048.

Hedysarum alpinum L. var. **americanum** Michx. — Common in upland open woods, prairies, river banks, and lake beaches about Great Slave Lake and in the Wood Buffalo Park, but not found thus far on Lake Athabaska. Known on Great Bear Lake (*J. M. Bell*, O) and the lower Mackenzie (*McConnell*, O; *Miss E. Taylor*, O). — McMurray, no. 7057; Calumet, Athabaska R., no. 998; Government Hay Camp district, Slave R., no. 2807. Great Slave L.: Keith Isl., no. 996; N. shore of McLeod Bay, no. 1000; Fairchild Pt., nos. 997, 999, 1001, 1002; S. W. and N. shores, *Howe*, no. 91991 (O); N. W. shore, *Bedford* (O).

Hedysarum Mackenzii Richards. — Occasional in open woods and thickets and on river banks northward to the lower Mackenzie (*Onion*, N) and Great Bear Lake (*J. M. Bell*, O), but not found thus far in the pre-Cambrian country. — Upper Slave R. lowland, nos. 1004, 1005. Great Slave L.: base of Maufelly Pt., no. 1003; N. W. shore, *Bedford* (O).

Vicia americana Muhl. — Abundant in prairies, open woods, and cabin clearings northward at least to Great Slave Lake, and noted by Richardson to Great Bear Lake. Although common just west of the Paleozoic boundary it has been collected only once in the pre-Cambrian country. — Lower Athabaska R., *Kennicott* (N); Calumet, nos. 1007, 1008; near Pt. La Roche, S. shore of L. Athabaska, no. 7013; E. shore of L. Mamawi, nos. 2783, 4410; upper Slave R. lowland, nos. 2796, 2798; Ft. Smith, no. 1006; Hay R., Great Slave L., *Hume*, no. 102670 (O).

Vicia americana Muhl. var. **angustifolia** Nees. — Occasional in sloughs and on sand ridges in the Wood Buffalo Park, and possibly only a form of the species. — Upper Slave R. (30th base line), no. 1010; lower Slave R., no. 1009.

Lathyrus ochroleucus Hook. — Abundant in prairies, clearings, and dry open woods northward at least to the Wood Buffalo Park and noted in Fl. Bor.-Am. as extending to Great Bear Lake. Scarcely known east of the Paleozoic boundary. — Waterways, no. 2749; McMurray, *Dutilly*, no. 119(G); along Athabaska R. about 6 mi. below McMurray, no. 987; Calumet, no. 984. Lake Athabaska: Shelter Pt., nos. 983, 985; near Pt. La Roche, S. shore, no. 7014. Along Quatre Fourches R., no. 989; upper Slave R. lowland, nos. 988, 2745; Ft. Smith, no. 986; and *Miss E. Taylor*, no. 5507(O); and *Seton & Preble*, nos. 78319, 78320 (O). Resolution, *Onion*, *Kennicott & Hardisty* (N).

GERANIACEAE

Geranium Bicknellii Britton. — See Rhod. 37: 295–301 (1935). — Occasional to common in upland woods and clearings northward at least to Lake Athabaska and the Wood Buffalo Park. In the latter it is abundant in recently burned areas. — Lake Athabaska: near Sand Pt., no. 4480; hills near base of Cornwall Bay, nos. 6436, 6517, 6562; N. shore, short distance W. of Fond du Lac, *J. W. Tyrrell*, no. 101142(O) (*G. carolinianum* of Tyrrell's list). Fort Smith, no. 1011.

LINACEAE

Linum Lewisii Pursh. — Common or occasional on dry prairies and bluffs northward to Great Bear Lake (*J. M. Bell*, O) and the Mackenzie (*Dutilly*, G), but not known east of the Paleozoic boundary. Noted by Richardson (under *L. perenne*) "as far north as the shores of the Arctic Sea."

CALLITRICHACEAE

Callitriche palustris L. — Apparently occasional in small pools and ponds northward at least to Great Slave Lake. — McMurray, no. 7097. Lake Athabaska: Shelter Pt., no. 1023; Sand Pt., no. 4568; along William R., no. 6876. Great Slave L.: N. W. shore, *Bedford* (O).

Callitriche hermaphroditica L. — See Rhod. 25: 211 (1923), and Vierteljahrssch. Nat. Ges. Zür. 53⁴: 548 (1909). — Common in ponds and slow streams in the Wood Buffalo Park, but very little collected elsewhere in the Mackenzie basin. Noted in Fl. Bor.-Am. "as far north as Bear Lake, lat. 66°." — Mamawi Cr., no. 2812.

EMPETRACEAE

Empetrum nigrum L. — Abundant in rocky woods and on sandy beaches and dunes throughout the pre-Cambrian parts of our area, but only occasional in the Wood Buffalo Park. — Lake Athabaska: Shelter Pt., nos. 1014, 1015, 1016; Sand Pt., no. 4586; Charlot Pt., no. 6156; Fishhook Bay, no. 6590; 2 mi. E. of Wolverine Pt., no. 6838; dunes just E. of Ennuyeuse Cr., no. 6921. Great Slave L.: Taltheili Narrows, no. 1017; Maufelly Pt., no. 1018; Fairchild Pt., nos. 1013, 1019, 1020; Ft. Reliance, no. 1021; S. W. and N. shores, *Howe*, no. 91979 (O); 12 mi. E. of Moraine Pt., *Bedford* (O). Last woods, Artillery L., *Seton & Preble*, no. 78390(O).

BALSAMINACEAE

Impatiens Noli-tangere L. — See Bull. No. 74:, Nat. Mus. Can. 149 (1935). — Known in our region only in the lowlands about the western end of Lake Athabaska, where it is common or occasional in rich woods and damp thickets. Mackenzie basin records in Fl. Bor.-

Am. under *I. fulva*, "as far north as Bear Lake; lat. 66°," probably refer to this species. — East shore of L. Mamawi, no. 4412; Chipewyan, no. 4690.

Impatiens sp. — Apparently too young for definite determination. Although they are mere seedlings, some of the plants have produced some cleistogamous flowers and fruit. All of the material (about 70 plants) came from a space about 10 inches in diameter, from about 80 seeds which still cling to the roots. Found in the moss mat of a timbered, upland muskeg in the Wood Buffalo Park.

RHAMNACEAE

Rhamnus alnifolia L'Hér. — Known in the Mackenzie basin only along the lower Athabaska River where it is common in wet lowland woods. — McMurray, no. 7121; Calumet, no. 1022; along lower Firebag R., no. 6020.

GUTTIFERAE

Hypericum majus (Gray) Britton. — Known in the Mackenzie basin only on damp sandy shores about Lake Athabaska, where it is common to abundant. — Lake Athabaska: Shelter Pt., nos. 1024, 1025, 4436; Sand Pt., no. 4550; 5 mi. S. E. of Wolverine Pt., no. 6818; 2 mi. W. of Ennuyeuse Cr., no. 6980.

CISTACEAE

Hudsonia tomentosa Nutt. var. **intermedia** Peck. — Abundant on sandy beach ridges and dunes about Lake Athabaska, and noted by Richardson "as far north as Slave Lake." Otherwise unknown in our region except for the Kennicott specimen cited below. — Lower Athabaska R., *Kennicott* (N). Lake Athabaska: Shelter Pt., no. 1026; near Sand Pt., no. 4618; shore of main lake just W. of Ellis Bay, no. 6273; 2 mi. E. of Wolverine Pt., no. 6715; just W. of Ennuyeuse Cr., no. 6942.

Lechea intermedia Leggett var.¹ — Known in the Mackenzie basin from a single locality on the south side of Lake Athabaska, where it grows on burned-over sand plains among young Banksian pines. — Near Archibald R., S. of Wolverine Pt., no. 6745.

VIOLACEAE

Viola nephrophylla Greene. — Known in our region from a single locality in the Wood Buffalo Park, and elsewhere in the Mackenzie basin only in the Peace River region.

Viola palustris L. — Occasional in wet woods and muskegs along

¹A distinctive form of the species, to be described in a forthcoming monograph of the genus by Dr. A. R. Hodgdon.

the lower Athabaska River, and on the north shore of Lake Athabaska. A specimen in Herb. G is labeled "Arct. Am. Back? Syn. Fl. N. Am." and "Capt. Back coll."; but no locality is given, and it is difficult to correlate it with any of the records in Back's list. — Along lower Firebag R., no. 6025. Lake Athabaska: Sand Pt., no. 4554; Camsell Portage, no. 6200.

Viola renifolia Gray var. **Brainerdii** (Greene) Fern. — Occasional to common in rich woods northward to the Mackenzie (*Onion, Kennicott & Hardisty*, N; *Miss E. Taylor*, G, O), but scarcely known east of the Paleozoic boundary. Richardson's record for *V. blanda*, "as high north as Fort Franklin, in lat. 66°," probably belongs here, and there is a Hooker specimen of *V. renifolia*, var. *Brainerdii* in Herb. G originally labeled *V. blanda* which presumably came from the north, although no locality is given. — Along lower Athabaska R. about 15 mi. below McMurray, no. 1028; along lower Firebag R., no. 6026; Chipewyan, no. 4677.

Viola rugulosa Greene. — Apparently rather widely distributed in the Mackenzie basin west of the Paleozoic boundary. It is common in open upland woods in the Wood Buffalo Park and southward. — Lower Athabaska R., *Miss E. Taylor*, no. 2370(O); Waterways, no. 2829.

Viola adunca J. E. Smith. — Common in upland semi-open prairies and rock crevices northward to the Mackenzie River (*Kennicott*, N) and Great Bear Lake (*J. M. Bell*, O), but not known far east of the Paleozoic boundary. — Waterways, no. 2821; along Athabaska R. just below MacKay, no. 6003. Lake Athabaska: Chipewyan, *J. W. Tyrrell*, no. 101167(O) (probably *V. canina* var. *sylvestris* of Tyrrell's list; the list cites Fond du Lac as the locality, but the date on the specimen is June 19, 1893, at which time Tyrrell was at Chipewyan); Shelter Pt., no. 1029. East shore of L. Mamawi, no. 2824.

ELAEAGNACEAE

Elaeagnus commutata Bernh. — *E. argentea* Pursh, not Moench. — Abundant on dry river bluffs, and occasional on dry upland prairies and sandy lake shores northward to the Mackenzie (*Miss E. Taylor*, G, N, O; *Dutilly*, G), but not known in the pre-Cambrian country. — Calumet, Athabaska R., no. 1033.

Shepherdia canadensis (L.) Nutt. — *Lepargyrea canadensis* (L.) Greene. — Common in woods and thickets northward to Great Slave Lake, and known on the lower Mackenzie (*Miss E. Taylor*, O). — Calumet, Athabaska R., no. 1044. Lake Athabaska: Shelter Pt., no. 1043; near Sand Pt., no. 4668; Charlot Pt., no. 6219; Cornwall Bay, no. 6598. East shore of L. Mamawi, no. 2841; Quatre Fourches R., no. 1035;

upper Slave R. lowland, nos. 1036, 2835, 2836; Ft. Smith, no. 1034; and *Seton & Preble*, no. 78389(O). Great Slave L.: near Caribou Isl., *Seton & Preble*, no. 78388(O); Taltheilei Narrows, no. 1041; Fairchild Pt., nos. 1037, 1039, 1040, 1042, 1045; Yellowknife Bay, no. 1038; S. W. and N. shores, *Howe*, no. 91982(O); N. W. shore, *Bedford* (O).

ONAGRACEAE

***Epilobium angustifolium* L.** — *Chamaenerion angustifolium* (L.) Scop. — Abundant throughout the timbered region, in open woods, clearings, prairies, and burned areas. In the pre-Cambrian it grows on rocky hills and ancient lake beaches. — Calumet, Athabaska R., nos. 1061, 1062, 1069. Lake Athabaska: Shelter Pt., nos. 1057, 1059, 1060, 1067; just E. of Charlot Pt., no. 6375; 2 mi. E. of Wolverine Pt., no. 6795. Quatre Fourches R., no. 1066; upper Slave R. lowland, nos. 1065, 2862; Ft. Smith, no. 1053 (*Mrs. Conibear* coll.), 1056. Great Slave L.: Taltheilei Narrows, no. 1058; Fairchild Pt., nos. 1054, 1055, 1068; Ft. Reliance, no. 1064; Yellowknife Bay, no. 1063; Hay R., *Hume*, no. 102672(O); 12 mi. E. of Moraine Pt., *Bedford* (O).

***Epilobium latifolium* L.** — *Chamaenerion latifolium* (L.) Sweet. — Chiefly an arctic and alpine species known in our region only on Great Slave Lake and in the Lockhart basin, where it grows on sandy shores and in dry woods. — Great Slave L.: base of Maufelly Pt., no. 1073; Fairchild Pt., nos. 1071, 1072; Ft. Reliance, nos. 1070, 1074; N. W. shore, *Bedford* (O). Last Woods, Artillery L., *Seton & Preble*, no. 78331(O).

***Epilobium palustre* L.** — Common in muskegs and wet meadows northward to Lake Athabaska and the Wood Buffalo Park, and known on Great Slave and Great Bear Lakes (*J. M. Bell*, O). — Lake Athabaska: Chipewyan, no. 4698; Shelter Pt., no. 1050; near Sand Pt., no. 4638; 2 mi. W. of Ennuyeuse Cr., no. 6979. East shore of L. Mamawi, no. 2845; Murdock Cr. district, no. 2855. Great Slave L.: Fairchild Pt., nos. 1051, 1052.

***Epilobium palustre* L. var. *monticola* Haussk.** — Common or occasional about Lake Athabaska and along the upper Slave River. Part of the material cited in Fl. Bor.-Am. under *E. palustre* var. *albiflora*, "as far north as lat. 64°," probably belongs here. — Lake Athabaska: Shelter Pt., nos. 1046, 4427; near Sand Pt., no. 4474; along Charlot R. near its mouth, no. 6361; 5 mi. E. of Poplar Pt., no. 6695. Government Hay Camp district, Slave R., no. 2844.

***Epilobium glandulosum* Lehm. var. *adenocaulon* (Haussk.) Fern.** — *E. adenocaulon* Haussk. — See *Rhod.* 20: 35 (1918). — Common in sloughs, wet meadows, and on lake shores northward to Lake

Athabaska and the Wood Buffalo Park, and at least occasional on Great Slave Lake. — McMurray, no. 7076; lower delta of Athabaska R., no. 1049. Lake Athabaska: Shelter Pt., nos. 1047, 1048; N. of Cornwall Bay, no. 6495; along Ennuyeuse Cr., near its mouth, no. 6927. East shore of L. Mamawi, no. 2870; Murdock Cr. district, no. 2863; N. W. shore of Great Slave L., *Bedford* (O).

Epilobium leptocarpum Haussk. var. ***Macounii*** Trel. — Known in the Mackenzie basin east of the Rocky Mountains only from the type material, which was collected "On moist rocks, Lake Athabaska" by John Macoun, September 3, 1875. Macoun's journal shows that he was in the Athabaska delta on Sept. 3, somewhere within 25 miles of the lake, and in a country notable for the absence of "rocks." In his Catalogue he wrote "Lake Athabaska, near Fort Chipewyan, Lat. 59°," which further confuses the exact locality from which the type came. — Moist rocks, L. Athabaska. *John Macoun*, no. 8931 (G, O) (*E. minutum* of Macoun's Cat.)

Circaea alpina L. — Occasional to common in rich woods northward to the Athabaska River delta, but unknown elsewhere in the Mackenzie basin, east of the Rocky Mountains. — McMurray, no. 7107; Reed Portage, upper Athabaska delta, no. 2843.

HALORAGIDACEAE

Myriophyllum exalbescens Fern. — *M. spicatum* L. of auth. — See Rhod. 21: 120 (1919). — Noted in Fl. Bor.-Am. "as far north as the Bear Lake," and abundant in shallow slough ponds and slow streams northward at least to Great Slave Lake. — Mamawi Cr., no. 2882. Lake Athabaska: pond just N. of Cornwall Bay, no. 6623; 2 mi. W. of Ennuyeuse Cr., no. 7005. Murdock Cr. district, no. 2884; Fairchild Pt.; Great Slave L., no. 1075.

HIPPURIDACEAE

Hippuris vulgaris L. — Common in shallow ponds and sluggish streams throughout the region, and known on the lower Mackenzie (*Kennicott?*, N). — Lower delta of Athabaska R., no. 1077. Lake Athabaska: Shelter Pt., no. 1078; muskeg N. of Cornwall Bay, no. 6496; along Archibald R., S. of Wolverine Pt., no. 6737. Upper Slave R. lowland, nos. 2877, 2878, 2879. Great Slave L.: Taltheilei Narrows, no. 1076; Fairchild Pt., no. 1079; E. shore of Charlton Bay, no. 1081; Yellowknife Bay, no. 1080; 12 mi. E. of Moraine Pt., *Bedford* (O).

ARALIACEAE

Aralia nudicaulis L. — Common to abundant in open woods northward at least to Lake Athabaska and the Wood Buffalo Park, and noted

in Fl. Bor.-Am. "throughout the woody country to lat. 64°." — Calumet, Athabaska R., no. 1083. Lake Athabaska: Shelter Pt., nos. 1084, 1085; Sand Pt., no. 4561; Charlot Pt., no. 6142.

UMBELLIFERAE

Cicuta occidentalis Greene. — Occasional in wet meadows northward at least to the Wood Buffalo Park, but not known east of the Paleozoic boundary. Part of the material cited under *C. maculata* in Fl. Bor.-Am., "between lat. 54° and 64°," probably belongs here, as may also part of Harper's unverified records on the Tazin River and near the mouth of the Taltson. — Calumet, Athabaska R., no. 1087; lower delta of the Athabaska, no. 1086; E. shore of L. Mamawi, nos. 2890, 4403; 30th base line district, upper Slave R., no. 1088.

Cicuta mackenzieana, sp. nov.

PLATE 197¹

Herba perennis erecta robusta, 4–10 dm. alta; radix ovoidea ad breviter oblonga, recta, infra radicibus pluribus incrassatis et supra fibrosis instructa; folia inaequaliter bipinnata, plerumque purpurascens, habitu erecto et stricto, segmentis ultimis anguste lanceolatis vel ellipticis, plerisque 1–5 mm. latis, vel segmentis foliorum inferiorum circa 1 cm. latis acute dentatis dentibus 3–5 per cm., foliolis saepe imperfecte divisis; umbellae ad 15 cm. latae, ramis 7–14 (plerumque 8–12); umbellulae 1.5–2.5 cm. (plerumque circa 2 cm.) latae, pedicellis 25–45 subaequantibus; involucri bracteis paucis anguste lanceolatis vel nullis, involucella bracteolis paucis anguste lanceolatis acuminatis; fructus latior quam longus (1.5–2.2 mm. \times 2–3 mm.) ad commissuram non constrictus, costis lateralibus majoribus.

Sandy margin of a lagoon near the south shore of Lake Athabaska about 1½ miles west of Ennuyeuse Creek, Aug. 25, 1935, no. 6976 (Type, G).

The existence of a distinctive subarctic species of *Cicuta* was recently suggested by Dr. Nicholas Polunin while studying material collected by himself at Fort Churchill, Hudson Bay. However, not only these but also earlier specimens at the Gray Herbarium from the same region had been collected early in the season and were without mature fruit. Plants collected by the writer on Lake Athabaska in 1935, and elsewhere in the central part of the Mackenzie basin on former occasions, now provide a good series whereby the form may be properly described. *Cicuta mackenzieana* appears to be rather common on sandy lake and swamp margins about Lake Athabaska, and is at least occasional in the Wood

¹PLATE 197. *Cicuta mackenzieana* Raup. Part of type collection from a lagoon near the south shore of L. Athabaska about 1½ mi. W. of Ennuyeuse Cr., no. 6976; details of umbellet \times 3, and of fruits \times 8.

Buffalo Park and about Great Slave Lake. The following specimens are referred to it: margin of lagoon near mouth of Archibald R., south shore of L. Athabaska, no. 6764; muskeg margin about 3 mi. west of mouth of Ennuyeuse Cr., no. 6964; sandy shore of William R., just above its mouth, no. 6861; muskeg margin at Shelter Pt., L. Athabaska, no. 1089; Axis Lake, near E. end of L. Athabaska, *Campbell*, no. 132402 (O); slough margin near Moose (Eight) L., Wood Buffalo Park, no. 2892 (cited as *C. occidentalis* in *Bot. Invest.* etc.); Yellowknife Bay, Gr. Slave L., no. 1093. The Hudson Bay specimens noted above may now be cited as typical, and are as follows: Fort Churchill, *J. M. Macoun*, no. 79261 (distributed as *C. virosa*), "Hudson Bay," *Burke*, and Churchill, *Polunin*, no. 73. Material noted in Fl. Bor.-Am. under *C. virosa*, "between lat. 54° and 64°," probably belongs here, at least in part.

With its fruits shorter than broad this species suggests *C. vagans* Greene which has orbicular fruits, but it differs from *C. vagans* in having them unconstricted at the commissure. In the latter character it resembles the eastern *C. maculata* L., but *C. maculata*, as well as its western relative, *C. occidentalis*, has distinctly oblong fruits. *C. macenzieana* differs from all of these forms, further, in having smaller fruits, umbels of many nearly equal branches (25–45, usually 30–40, as against the usual number of 30 or less very unequal ones in the other species), and in having very narrowly lanceolate, saliently dentate leaflets which are purplish-tinged and strict in habit.

***Cicuta bulbifera* L.** — Apparently rare or occasional in the Mackenzie basin, and known thus far only from the Wood Buffalo Park and the south side of Lake Athabaska. It grows on sandy lake shores in the latter place. — Two mi. W. of Ennuyeuse Cr., L. Athabaska, no. 6977.

***Sium suave* Walt.** — *S. cicutaeifolium* Gmel. of auth. — See Rhod. 17: 131 (1915). — Common in wet meadows and on marshy slough margins northward at least to Great Slave Lake, but extending east of the Paleozoic boundary only short distances. Part of the material noted in Fl. Bor.-Am. under *Cicuta virosa*, north to lat. 64°, appears to have been this species. — Lower delta of Athabaska R., no. 1090; Shelter Pt., L. Athabaska, no. 1091; E. shore of L. Mamawi, nos. 2898, 4408; upper Slave R. lowland, nos. 1092, 2902. Great Slave L.: Resolution, *Kennicott* (N); N. W. shore, *Bedford* (O); Ft. Rae, *Bedford* (O).

***Heracleum lanatum* Michx.** — Occasional to common in clearings and semi-open prairies in the southern part of the Mackenzie basin, extending northward at least to the Wood Buffalo Park. In Fl. Bor.-

Am. it is given the somewhat anomolous range, "as far north as the Mackenzie River in lat. 58°"; and there is an Onion, Kennicott & Hardisty specimen in Herb. N. upon which no locality is mentioned, but it *might* have come from the Mackenzie. — McMurray, no. 7119.

CORNACEAE

Cornus canadensis L. — *Chamaepericlymenum canadense* (L.) Aschers. & Graebn. — Usually noted as occurring throughout the wooded country, but judging by the writer's observations it is not common about the eastern arm of Great Slave Lake. It is most abundant in open woods. — Calumet, Athabaska R., nos. 1095, 1098. Lake Athabaska: Shelter Pt., no. 1094; near Sand Pt., no. 4621; Charlot Pt., no. 6397; 5 mi. E. of Poplar Pt., no. 6637; sand hills about 4 mi. S. E. of Wolverine Pt., no. 6783. Quatre Fourches R., no. 1097; Gov. Hay Camp district, no. 2916; Ft. Smith, no. 1096; and *Miss E. Taylor* (G, N, O); and *Seton & Preble*, no. 78332(O). Great Slave L.: N. W. shore, *Bedford* (O); near Ft. Rae, *Russell* (O); Hay R., *Hume*, no. 102673(O).

Cornus stolonifera Michx. — Common on stream banks and lake shores northward to the Mackenzie, mostly west of the Paleozoic boundary, but occasional on the north shore of Lake Athabaska where it has been found only in dolomitic areas. — McMurray, no. 7077; along the Athabaska a few miles below McMurray, no. 1100; Calumet, no. 1102. Lake Athabaska: thicket on hillside S. of Wabba L., no. 6484; near base of Cornwall Bay, no. 6575. East shore of L. Mamawi, no. 2910; along the Quatre Fourches R., no. 1099; upper Slave R. lowland, nos. 1103, 1104, 2909; near upper Smith rapids, no. 1101.

Cornus stolonifera Michx. var. **Baileyi** (Coul. & Evans) Drescher. — *C. Baileyi* Coul. & Evans. — This form is apparently confined to the southwestern part of the Mackenzie basin and is known in our region only in the Wood Buffalo Park.

PYROLACEAE

Chimaphila umbellata (L.) Bartr. var. **occidentalis** (Rydb.) Blake. — See Rhod. 19: 237-44 (1917). — Known in the Mackenzie basin east of the Rocky Mountains only on Lake Athabaska. It grows in sandy spruce woods and is rather common on some parts of the south shore. — Chipewyan, no. 7020; 2 mi. E. of Wolverine Pt., no. 6798; Turnor Pt., no. 6840.

Moneses uniflora (L.) Gray. — Common in rich woods and timbered muskegs northward at least to Great Bear Lake (*J. M. Bell*, O) and the upper Mackenzie (*Kennicott*, N; *Miss E. Taylor*, G, N, O), but

apparently only occasional about Lake Athabaska. — Calumet, Athabaska R., no. 1106; near base of Cornwall Bay, L. Athabaska, no. 6477; near upper Smith Rapids, no. 1105. Great Slave L.: *R. Bell*, no. 23203(O); Fairchild Pt., nos. 1107, 1108, 1109; S. W. and N. shores, *Howe*, no. 91962(O); Windy Pt., *Hume*, no. 102676(O); Ft. Rae, *Russell* (O).

***Pyrola minor* L.** — *Erxlebenia minor* (L.) Rydb. — Known in our region only on Lake Athabaska where it is rather common in damp thickets at sandy lagoon margins near the lake. Apparently rare elsewhere in the Mackenzie basin except in the Rocky Mountains. — Lake Athabaska: Sand Pt., no. 4558; mouth of Charlot R., no. 6319; mouth of Archibald R., no. 6771.

***Pyrola secunda* L.** — *Ramischia secunda* (L.) Garcke. — Common in rich woods and timbered muskegs northward to Great Bear Lake (*J. M. Bell*, O) and the Mackenzie River (*Miss E. Taylor*, O; *Dutilly*, G). — Calumet, Athabaska R., no. 1131. Lake Athabaska: Shelter Pt., nos. 1132, 1133; near Sand Pt., no. 4598; Charlot Pt., nos. 6296, 6402; mouth of Archibald R., no. 6767. Upper Slave R. lowland, nos. 1130, 2926, 2927. Great Slave L.: *Kennicott* (N); near Caribou Isl., *Seton & Preble*, no. 78346(O) (*P. secunda* var. *pumila* of *Seton's* list); Fairchild Pt., nos. 1134, 1135, 1136; Yellowknife Bay, no. 1137; N. W. shore, *Bedford* (O).

***Pyrola chlorantha* Sw.** — See *Rhod.* 22: 49 (1920). — Common in upland woods and damp thickets northward at least to the upper Mackenzie (*Miss E. Taylor*, G, O), and noted by Richardson at Great Bear Lake. — Calumet, Athabaska R., no. 1126; lower Athabaska R., *Kennicott* (N). Lake Athabaska: mouth of Charlot R., no. 6332; Charlot Pt., no. 6398; 5 mi. E. of Poplar Pt., no. 6638; near mouth of Archibald R., no. 6762; 2 mi. W. of Ennuyeuse Cr., no. 6943. Great Slave L.: *Richardson* (G); base of Maufelly Pt., no. 1125; Fairchild Pt., nos. 1123, 1124, 1127, 1128, 1129; N. W. shore, *Bedford* (O).

***Pyrola grandiflora* Rad.** — An arctic and alpine species known in our region only in the pre-Cambrian country, and westward on Great Slave Lake. — Lake Athabaska: west shore of Ellis Bay, no. 6164; Charlot Pt., nos. 6221, 6225, 6294; N. shore (probably near Fond du Lac), *J. W. Tyrrell*, no. 15780(O) (*P. rotundifolia* var. *pumila* of *Tyrrell's* list). Slave R., *Richardson* (G). Great Slave L.: near Caribou Isl., *Seton & Preble*, no. 78347(O); S. W. and N. shores, *Howe*, no. 91963(O). Last woods, Artillery L., *Seton & Preble*, no. 78348(O); and *J. W. Tyrrell*, no. 23205(O) (*P. pumila* of *Tyrrell's* list); shore of Artillery L., about 3 mi. N. of Lockhart R., *J. W. Tyrrell*, no. 23206(O) (*P. pumila* of *Tyrrell's* list).

***Pyrola asarifolia* Michx.** — Common in poplar and spruce woods northward at least to the Wood Buffalo Park, and known on the Mackenzie (*Onion*, N). Although occasional about Lake Athabaska it has not been found elsewhere east of the Paleozoic boundary. — McMurray, no. 7085; Calumet, Athabaska R., no. 1112. Lake Athabaska: Chipewyan, *Richardson* (O) (*P. rotundifolia* of Fl. Bor.-Am. and Macoun's Cat., in part); Charlot Pt., no. 6396; 5 mi. E. of Poplar Pt., no. 6639a; mouth of Archibald R., no. 6770. Along the Quatre Fourches R., no. 1110?, 1113; near upper Smith Rapids, no. 1114; Ft. Smith, no. 1111.

***Pyrola asarifolia* Michx. var. *incarnata* (Fisch.) Fern.** — Habitat similar to that of the species, but with a somewhat wider range throughout the wooded country. Earlier material has been named *P. borealis* by Rydberg, the type of which is a specimen collected on the Mackenzie River by *Onion* (N), but the writer has preferred to keep it as a variety of *P. asarifolia*. If it is raised to specific rank, an earlier name is available, *P. canadensis* H. Andres (Öst. Bot. Z. 64: 250. 1914). — Calumet, Athabaska R., no. 1120. Lake Athabaska: hills N. E. of Cornwall Bay, no. 6529; 5 mi. E. of Poplar Pt., no. 6639. Upper Slave R. lowland, nos. 1115, 2949; vicinity of Ft. Smith, *Miss E. Taylor* (G, O). Great Slave L.: Taltheilei Narrows, nos. 1121, 1122; N. shore of McLeod Bay, no. 1116; base of Maufelly Pt., no. 1117; Fairchild Pt., nos. 1118, 1119; Windy Pt., *Hume*, no. 102675(O); N. W. shore, *Bedford* (O); near Ft. Rae, *Russell* (O). There are specimens in Herb.'s G and N, marked "King in Back's Voyage" or ". . . Journey," and originally labeled *P. rotundifolia*. Judging by the Botanical Appendix to Back's Narrative, they came from "Athabasca."

***Pyrola elliptica* Nutt.** — Known thus far only in the central and southern parts of the Mackenzie basin, and in our region only at McMurray and on Lake Athabaska where it grows in damp sandy thickets or upland woods. — McMurray, no. 7084. Lake Athabaska: Sand Pt., no. 4557; 5 mi. E. of Poplar Pt., no. 6669.

***Monotropa uniflora* L.** — Apparently rare or occasional in the Mackenzie basin, and known thus far only on Lake Athabaska and along the Slave River. — Lake Athabaska: woods along shore just E. of Chipewyan, no. 7040; rich woods on old sand beaches, 2 mi. W. of Ennuyeuse Cr., no. 6901. Slave R., *Miss E. Taylor* (G, O).

ERICACEÆ

***Ledum groenlandicum* Oeder.** — Common in muskegs throughout the wooded country. — Calumet, Athabaska R., no. 1157. Lake Athabaska: Shelter Pt., nos. 1158, 1161, 1162, 1163; Sand Pt., nos. 4525, 4593; N. shore of Ellis Bay, no. 6113; 5 mi. E. of Poplar Pt., no. 6692;

along Archibald R., S. of Wolverine Pt., no. 6735. Smith Portage, *Miss E. Taylor*, no. 59851(O). Great Slave L.: near Caribou Isl., *Seton & Preble*, no. 77357(O); island near Keith Isl., no. 1156; Talttheilei Narrows, nos. 1159, 1164; Fairchild Pt., nos. 1155, 1165, 1166; Yellowknife Bay, no. 1160; 12 mi. E. of Moraine Pt., *Bedford* (O); S. W. and N. shores, *Howe*, no. 91964(O). Last woods, Artillery L., *Seton & Preble*, no. 78358(O).

Ledum palustre L. — This plant is most commonly represented in the Mackenzie basin by its variety *decumbens*, but a form referable to the typical species was found in sandy pine woods on the south shore of Lake Athabaska. — About 3 miles E. of Wolverine Pt., no. 6807.

Ledum palustre L. var. *decumbens* Ait. — An arctic variety occasional in the Wood Buffalo Park and on Lake Athabaska, but commoner northward. It is found in muskegs. — Lake Athabaska: near Sand Pt., no. 4523. Great Slave L.: Caribou Isl., *Seton & Preble*, no. 78354(O) (*L. palustre* of Seton's list); Talttheilei Narrows, no. 1189; Fairchild Pt., nos. 1167, 1168; S. shore, *Brooke* (O). Near southern end of Artillery L., *J. W. Tyrrell*, no. 23199(O) (*L. palustre* of Tyrrell's list); Last Woods, Artillery L., *Seton & Preble*, no. 78355(O) (*L. palustre* of Seton's list); Clinton-Colden L., *J. W. Tyrrell*, no. 23198(O) (*L. palustre* of Tyrrell's list).

Rhododendron lapponicum (L.) Wahl. — An arctic species known in our region only on Great Slave Lake and in the Lockhart basin. It grows in muskegs and rock crevices. — Great Slave L.: *R. Bell*, no. 23209(O); Caribou Isl., *Seton & Preble*, no. 78360(O); Keith Isl., no. 1150; Talttheilei Narrows, no. 1151; Fairchild Pt., nos. 1148, 1149, 1152, 1153. Last woods, Artillery L., *J. W. Tyrrell*, nos. 23207, 23208 (O); and *Seton & Preble*, no. 78361(O).

Loiseleuria procumbens (L.) Desv. — An arctic and alpine species known in the Mackenzie basin east of the Rocky Mountains only on Great Bear Lake (*J. M. Bell*, O) and to the east of Great Slave Lake. — French L., Pike's Portage route, *J. W. Tyrrell*, no. 23200(O); Last woods, Artillery L., *J. W. Tyrrell*, no. 23201(O); and *Seton & Preble*, no. 78359(O).

Kalmia polifolia Wang. — Apparently confined to the more arctic parts of the timbered country, and extending somewhat into the Barren Lands. It has been collected on the Thelon River and in the Dubawnt drainage at Lat. 62°05' (*J. W. Tyrrell*, O). The range given in *Fl. Bor.-Am.* is "extending beyond the woody regions, but scarcely, . . . to the Arctic Circle," and *Preble* states, "not noted south of Smith Landing [Fitzgerald]," and "It apparently extends north to the Barren

Grounds." It has proved to be quite common in muskegs about Lake Athabaska. — Lake Athabaska: near Sand Pt., no. 4529; Camsell Portage, no. 6175; 5 mi. E. of Poplar Pt., no. 6657; along Archibald R., S. of Wolverine Pt., no. 6731. Resolution, *Kennicott* (N).

Cassiope tetragona L. — An arctic and alpine species known in our region only in the Lockhart basin. Richardson gave its range as "From lat. 54° to the Arctic Islands," in Fl. Bor.-Am., but there is no other indication of its presence so far south except in the Rocky Mountains. — Shore of Casba L., *J. W. Tyrrell*, no. 23193(O).

Andromeda Polifolia L. — Common in muskegs throughout the pre-Cambrian country, and at least occasional southward and westward. — Lake Athabaska: Sand Pt., nos. 4516, 4527; Camsell Portage, no. 6192; Charlot Pt., no. 6300; mouth of Charlot R., no. 6320; about 5 mi. S. E. of Wolverine Pt., no. 6828; point about 4 mi. E. of Wolverine Pt., no. 6804; 2 mi. W. of Ennuyeuse Cr., no. 7012. Great Slave L.: Resolution, *Kennicott* (N); Caribou Isl., *Seton & Preble*, no. 78349 (O); Keith Isl., no. 1140; Taltheilei Narrows, nos. 1142, 1143, 1144; base of Maufelly Pt., no. 1147; Fairchild Pt., nos. 1141, 1145, 1146; S. W. and N. shores, *Howe*, no. 91965(O); N. W. shore, *Bedford* (O). Lockhart R., 3 mi. from Artillery L., *J. W. Tyrrell*, no. 23191(O); Last Woods, Artillery L., *Seton & Preble*, no. 78350(O); E. end of Clinton-Colden L., *J. W. Tyrrell*, no. 23192(O).

Chamaedaphne calyculata (L.) Moench. — Common in wet muskegs throughout the timbered country northward at least to Lake Athabaska and the Wood Buffalo Park. Apparently occasional on Great Slave Lake. Noted in Fl. Bor.-Am. "throughout the woody, and part of the barren country," and Preble states, "probably throughout the wooded area." — Lake Athabaska: Shelter Pt., nos. 1138, 1139; Sand Pt., no. 4526; Camsell Portage, no. 6190; 5 mi. E. of Poplar Pt., no. 6666; along Archibald R., S. of Wolverine Pt., no. 6736; N. shore, *J. W. Tyrrell*, no. 15519(O) (*Cassandra calyculata* of Tyrrell's list); "From Cumberland House to Fort Chipewyan," *Richardson* (O) (*Andromeda calyculata* of Fl. Bor.-Am., and *Cassandra calyculata* of Macoun's Cat.). Great Slave L.: Resolution, *Kennicott* (N); N. W. shore, *Bedford* (O).

Arctostaphylos Uva-ursi (L.) Spreng. — Common on sandy or rocky plains and hills, and in dry upland woods northward at least to Great Bear Lake (*J. M. Bell*, O). According to Preble it also extends into the Barren Lands. — Along the Athabaska just below McMurray, no. 1178; Calumet, nos. 1173, 1177; along the lower Firebag R., no. 6034. Lake Athabaska: Shelter Pt., nos. 1174, 1175, 1176, 4453;

Charlot Pt., no. 6078; Cornwall Bay, no. 6594; 2 mi. E. of Wolverine Pt., no. 6837; gravel dunes just E. of Ennuyeuse Cr., no. 6922. East shore of L. Mamawi, nos. 2999, 3000; along Quatre Fourches R., no. 1171; Ft. Smith, *Seton & Preble*, no. 78352(O). Great Slave L.: Resolution, *Kennicott* (N); near Caribou Isl., *Seton & Preble*, no. 78351(O); Taltheilei Narrows, nos. 1170, 1172; Fairchild Pt., nos. 1179, 1180, 1183; Ft. Reliance, no. 1182; Yellowknife Bay, no. 1181; and *Russell* (O); S. W. and N. shores, *Howe*, no. 91968(O); N. W. shore, *Bedford* (O); French L., Pike's Portage route, *J. W. Tyrrell*, no. 23188(O).

Arctostaphylos Uva-ursi (L.) Spreng. var. **adenotricha** Fern. & Macbr. — See *Rhod.* 16: 211-13 (1914). — A cordilleran form of the species known eastward in the Mackenzie basin from a single locality on the north shore of Lake Athabaska. — Upper slopes of a dolomitic hill near the base of Cornwall Bay, no. 6604.

Arctostaphylos rubra (Rehder & Wilson) Fern. — *Mairania alpina* (red-fruited form) Britton & Rydb. — *Arctous alpina* Niedenz. var. *rubra* Rehder & Wilson. — See *Rhod.* 16: 32 (1914). — Common about Great Slave Lake and northward but only occasional in the Wood Buffalo Park and on Lake Athabaska. It is usually found in muskeg timber. — Lake Athabaska: Charlot Pt., nos. 6224, 6299. Great Slave L.: *R. Bell*, no. 23148(O); Taltheilei Narrows, no. 1186; Fairchild Pt., nos. 1184, 1185, 1187, 1188; S. W. and N. shores, *Howe*, no. 91967(O); N. W. shore *Bedford* (O). Kipling L., Pike's Portage route, *J. W. Tyrrell*, no. 23190(O); Artillery L., 3 mi. N. of Lockhart R., *J. W. Tyrrell*, no. 23189(O); Last Woods, Artillery L., *Seton & Preble*, no. 78353(O).

Vaccinium canadense Richards. — *Cyanococcus canadensis* (Richards.) Rydb. — Common to abundant on sandy plains and rocky ridges northward to Lake Athabaska and the Wood Buffalo Park. Noted in Fl. Bor.-Am. as occurring north to Great Bear Lake, but the writer has seen no other record from beyond those cited below. — Athabaska R. below Pelican Rapids, *Harper*, no. 99015(O); Calumet, no. 1209; along the lower Firebag R., no. 6040. Lake Athabaska: Shelter Pt., nos. 1208, 1210, 1211; near Sand Point, no. 4619; Elliot Pt., no. 6426; 5 mi. E. of Poplar Pt., no. 6691; 2 mi. E. of Wolverine Pt., no. 6711; 2 mi. W. of Ennuyeuse Cr., no. 6934. Government Hay Camp district, Slave R., no. 2965.

Vaccinium uliginosum L. — See *Rhod.* 25: 23-5 (1923). — Common in muskegs and on sandy ridges and plains about the great lakes but very little known west of the Paleozoic boundary in our region. It grows to a height of 2-3 feet and produces abundant fruit. — Lake

Athabaska: Shelter Pt., no. 4447; near Sand Pt., no. 4510; small island about 2 mi. E. of Crackingstone Pt., no. 6424; N. shore, near Old Man R., *J. W. Tyrrell*, no. 101370(O); 5 mi. E. of Poplar Pt., nos. 6655, 6690; gravelly dunes just E. of Ennuyeuse Cr., no. 6918; shore ridges 2 mi. W. of Ennuyeuse Cr., no. 6948. Great Slave L.: Keith Isl., no. 1216; Taltheilei Narrows, nos. 1214, 1219; Fairchild Pt., nos. 1215, 1217, 1218, 1221, 1222; N. W. shore, *Bedford* (O). Last woods, Artillery L., *J. W. Tyrrell*, no. 23111(O); and *Seton & Preble*, no. 78382(O).

Vaccinium Vitis-Idaea L. var. **minus** Lodd. — *Vitis-Idaea Vitis-Idaea* (L.) Britton. — Common to abundant in muskegs and dry sandy woods throughout the region. — Lake Athabaska: Shelter Pt., nos. 1191, 1192 and 1193; near Sand Pt., no. 4620; N. shore near Cypress Pt., *J. W. Tyrrell*, no. 101377(O); base of Cornwall Bay, no. 6595; 2 mi. E. of Wolverine Pt., no. 6839. Along Quatre Fourches R., no. 1201; Ft. Smith, no. 1194; and *Seton & Preble*, no. 78384(O); and *Miss E. Taylor*, no. 15459(O). Great Slave L.: Taltheilei Narrows, no. 1195; Fairchild Pt., nos. 1196, 1198, 1200; Ft. Reliance, no. 1199; N. W. shore, *Bedford* (O); Old Ft. Rae, *Russell* (O). Near southern end of Artillery L., *J. W. Tyrrell*, no. 23113(O); Last Woods, Artillery L., *Seton & Preble*, no. 78383(O).

Vaccinium Oxycoccus L. — *Oxycoccus Oxycoccus* (L.) MacM. — Common on mossy hummocks in wet muskegs northward at least to Great Bear Lake (*J. M. Bell*, O). Preble states that it is especially common at Bear Lake and Fort Norman. Noted by Richardson "to the Arctic sea-shore." — Lake Athabaska: Shelter Pt., no. 1203, near Sand Pt., no. 4514; Charlot Pt., no. 6306. Great Slave L.: *Kennicott* (N); Taltheilei Narrows, no. 1205; N. shore of McLeod Bay, no. 1206; Fairchild Pt., nos. 1204, 1207; S. W. and N. shores, *Howe*, no. 91966 (O); near Ft. Rae, *Russell* (O).

DIAPENSIACEAE

Diapensia lapponica L. — An arctic species known in our region only in the Lockhart basin. — Casba L., *J. W. Tyrrell*, no. 23114(O).

PRIMULACEAE

Primula incana M. E. Jones. — See *Rhod.* 30: 59 (1928). — Occasional or common in damp meadows and prairies in the Wood Buffalo Park, but not known east of the Paleozoic boundary. Noted in Fl. Bor.-Am. (under *P. farinosa*) northward "to lat. 66° on the Mackenzie River." — Cascade Rapid, Athabaska R., *Miss E. Taylor*, no. 15828(O); Government Hay Camp district, Slave R., no. 3010; Great Slave L., *Richardson* (G).

Primula mistassinica Michx. — Common on damp sandy or stony shores about Athabaska and Great Slave Lakes, and known northward to Great Bear Lake (*J. M. Bell*, O) and the Mackenzie River (*Richardson*, G, under *P. Hornemanniana* of Fl. Bor.-Am.). — Lake Athabaska: Shelter Pt., nos. 1227, 1228; Sand Pt., nos. 4481, 4631; N. shore, *J. W. Tyrrell*, no. 15840(O); west shore of Ellis Bay, no. 6366. Great Slave L.: Keith Isl., no. 1226; Fairchild Pt., nos. 1224, 1225; S. W. and N. shores, *Howe*, no. 91961(O); Pine Pt., *Brooke* (O).

Primula egaliksensis Wormsk. — See *Rhod.* 30: 59 (1928). — Occasional on damp sandy shores in the eastern arm of Great Slave Lake, and known on Great Bear Lake (*J. M. Bell*, O). *Richardson* noted the range of *P. sibirica*, which appears to be identical with *P. egaliksensis*, as "Barren country between lat. 60° and 69°. — Great Slave L.: Keith Isl., no. 1230; base of Maufelly Pt., no. 1229.

Primula stricta Hornem. — See *Rhod.* 30: 59 (1928). — Known in our region only from an indefinite locality on Great Slave Lake, but apparently common or occasional on the Mackenzie River (*Dutilly*, G; *Miss E. Taylor*, O; *Richardson*, G.) — Shore of Great Slave L., *R. Bell*, no. 23158(O).

Androsace septentrionalis L. — See *Mem.* 126, *Biol. Ser.* no. 4, *Dept. of Mines, Can.*, 45 (1922). — Occasional in dry meadows, on sandy banks and rocky hills northward to the lower Mackenzie (*Miss E. Taylor*, O), but apparently rare eastward of the Paleozoic boundary. — Portage la Loche, *John Macoun*, no. 15863(O). Lake Athabaska: Chipewyan, nos. 4683, 6058; and *Preble & Carey*, no. 2(W) (N. E.; var. *puberulenta* of St. John's revision); Charlot Pt., no. 6093. East shore of L. Mamawi, no. 3005; Ft. Smith, nos. 1232, 3006; Resolution, *Kennicott* (N). — Extremely variable in form, size and degree of pubescence. The writer has preferred to maintain the forms represented in the Mackenzie basin in one species, although further collections may show well-defined geographical segregates.

Dodecatheon pauciflorum (Durand) Greene. — Abundant in the semi-open prairie country on the Salt Plain west of the Slave River, but not known elsewhere in the Mackenzie basin except for the *Kennicott* record cited. — Resolution, *Kennicott* (N).

Lysimachia thyrsiflora L. — *Naumbergia thyrsiflora* (L.) *Duby*. — Occasional on wet banks and shores northward at least to Great Slave Lake. Noted in Fl. Bor.-Am. from "Lake Huron to the Mackenzie River." — Lower Athabaska R., *Kennicott* (N); sandy pond margin about 5 mi. S. E. of Wolverine Pt., L. Athabaska, no. 6827; Old Ft. Rae, Great Slave L., *Russell* (G).

Trientalis borealis Raf. — *T. americana* (Pers.) Pursh. — See Rhod. 11: 236 (1909). — Common in rich woods northward to the lower Athabaska River and about Lake Athabaska. — Waterways, no. 3002; Calumet, Athabaska R., no. 1223; along lower Firebag R., no. 6037. Lake Athabaska: near Sand Pt., no. 4478; along Archibald R. near its mouth, no. 6760; 5 mi. S. E. of Wolverine Pt., no. 6819. Black R., E. of L. Athabaska, *J. W. Tyrrell*, no. 15925(O).

Trientalis europaea L. var. **arctica** (Fisch.) Ledeb. — *T. arctica* Fisch. — See Bull. 74, Nat. Mus. Can. 156 (1935). — Known in the Mackenzie basin only in the Wood Buffalo Park and southwestward. It grows in rich woods.

Glaux maritima L. — Common at the margins of saline flats and brine springs west of the Slave River, and known northward to the Mackenzie (*KenNICOTT*, N). — Sulfur Bay, Great Slave L., *Hume*, no. 102677(O).

PLUMBAGINACEAE

Statice interior, sp. nov.

PLATE 198¹

Herba perennis scaposa, e radice sensim ad basin plantae attenuata, 2–3 mm. crassa (ex sicco); folia linearia, dense congesta, foliis multis marcescentibus infra recentes, lamina glabra, 2–6 cm. longa, 2–3.5 mm. lata (plerumque circa 2.5 mm.), obtusa vel leviter apiculata, uno nervo conspicuo et 2 vel 4 nervis obscuris ad basin foliorum majorum; scapi novelli 1–7, plerumque paucis anni praeteriti persistentibus, glabri, plerique circa 1.2 mm. crassi, 10–18 cm. alti; capituli hemisphaerici, circa 2 cm. lati; spiculae pleraeque 2-florae; bractaeae fructiferae orbiculari-ovatae, basi cuneatae, margine leviter undulatae, scariosae, basi excepta flavescentes; flores breviter stipitati (1 mm. vel breviores), circa 7 mm. longi; calyx omnino glaber, arista exclusa circa 6 mm. longus, parte basali virescente circa 3 mm. longa et 1.5 mm. lata, nervis 5 primariis in parte superiore scariosa purpurascens, nervis intermediis in parte inferiore primarios aequantibus; calycis nervi primarii in dentes conspicuos aristas simulantes lobis conspicuis rotundatis separatos producti, dentibus 1.3–1.4 mm. ultra basin loborum productis; corolla rosea, lobis rotundatis vix calycem excedentibus.

Occasional in low damp places among the large sand dunes south of William Point, L. Athabaska, Aug. 16, 1935, no. 6895 (Type, G).

This species is distinct from all other North American forms in its broad leaves, its entirely glabrous calyx, and its prominent calyx teeth. Its leaves are nearly twice as broad as those of most American plants,

¹PLATE 198. *Statice interior* Raup. Part of type collection from dunes south of William Pt., Lake Athabaska, no. 6895; detail of flowers $\times 5$.

and its glabrous calyx would suggest removing it entirely from those sections of the genus represented in this country. Its nearest affinity appears to be *S. labradorica* (Wallr.) Hubbard & Blake, which has short cusps on the main lobes of the calyx. It differs from this species, however, in having the rounded intermediate lobes of the calyx prominently developed, to approximately half the length of the main lobes and cusps, all the lobes being .3-.4 mm. longer than those of *S. labradorica* var. *genuina* Blake which it most nearly resembles.

GENTIANACEAE

Gentiana Amarella L. — *Amarella plebeia* (Cham.) Greene. — Common in damp meadows, muskegs, open woods, and damp rock crevices northward to Great Slave Lake, and known on the lower Mackenzie (*Onion*, N). — McMurray, no. 7086. Lake Athabaska: Chipewyan, no. 7028; near Sand Pt., no. 4627; Fishhook Bay, no. 6591. East shore of L. Mamawi, no. 3037; Gov. Hay Camp district, nos. 3032, 3033; near upper Smith Rapids, no. 1238. Great Slave L.: Fairchild Pt., nos. 1235, 1236; Ft. Reliance, no. 1237; S. W. and N. shores, *Howe*, no. 91959(O); N. W. shore, *Bedford* (O); Ft. Rae, *Russell* (O).

Gentiana elegans A. Nels. — See Bull. 74, Nat. Mus. Can. 157 (1935). — Common or occasional northward to the Mackenzie River (*Jones*, O; *Onion*, N), and abundant on the Salt Plains west of the Slave River. It has not been found east of the Paleozoic boundary. — Government Hay Camp district, Slave R., no. 3027. Great Slave L.: S. W. and N. shores, *Howe*, no. 91958(O); Sulfur Bay, *Hume*, no. 102678(O).

Lomatogonium rotatum (L.) Fries. — *Pleurogyne rotata* (L.) Griseb. — *P. fontana* A. Nels. — See Rhod. 21: 197 (1919). — Occasional in damp meadows and muskeg thickets in the Wood Buffalo Park and northward to the Mackenzie (*Onion*, N), but not known east of the Paleozoic boundary. — S. W. and N. shores of Great Slave L., *Howe*, no. 91960(O).

Menyanthes trifoliata L. — See Rhod. 31: 195 (1929). — Common in very wet muskegs northward to Great Slave Lake, and known on the lower Mackenzie (*Kennicott*, N; *Miss E. Taylor*, O). — Lake Athabaska: East end, *J. W. Tyrrell*, no. 59564(O); William Pt., no. 6867; about 3 mi. W. of Ennuyeuse Cr., no. 6961. Great Slave L.: N. shore of McLeod Bay, no. 1234; Fairchild Pt., no. 1233; N. W. shore, *Bedford* (O).

APOCYNACEAE

Apocynum androsaemifolium L. — Noted in Fl. Bor.-Am. as occurring "throughout the woody country," but the northern-most speci-

mens seen by the writer are from Great Slave Lake. — Lake Athabaska: Shelter Pt., no. 1240; dolomitic hills near base of Cornwall Bay, nos. 6434, 6560; Sand hill country about 4 mi. S. E. of Wolverine Pt., no. 6779. Fort Smith (*Mrs. Conibear* coll.), no. 1239; N. W. shore of Great Slave L., *Bedford* (O).

Apocynum sibiricum Jacq. — *A. hypericifolium* Ait. — *A. cannabinum* L. var. *hypericifolium* (Ait.) Gray. — See *Rhod.* 37: 327–8 (1935). — Occasional on dry river banks along the lower Athabaska, and along the lower Peace River in the Wood Buffalo Park. — *McMurray*, no. 7065.

POLEMONIACEAE

Polemonium humile Willd. — Noted in *Fl. Bor.-Am.* "From lat. 66° to the Arctic sea-coast" (as *P. coeruleum* var. *humile*). The following specimens suggest a more southern range, and are the only ones available for the Mackenzie basin. — "Carlton House to Bear Lake," *Richardson* (G); Great Slave L., *Richardson* (G). — The genus *Polemonium* has been very little collected in the Mackenzie basin, particularly east of the Rocky Mountains. The species are very poorly defined in this region, and are much in need of further collection and study.

Collomia linearis Nutt. — *Gilia linearis* (Nutt.) Gray. — Common or occasional in dry prairies in the Wood Buffalo Park and southward. Noted by Harper on the lower Taltson River, and by Richardson "From Saskatchewan to Fort Franklin." A specimen in *Herb. G.* labeled Mackenzie R. is presumably from the Richardson collection. — East shore of L. Mamawi, no. 3023.

HYDROPHYLLACEAE

Phacelia Franklinii R. Br. — Common in clearings and natural openings about the great lakes and in the Wood Buffalo Park, becoming abundant in burned areas. It is at least occasional northward to Great Bear Lake (*Richardson*, G) (*Eutoca Franklinii* in *Fl. Bor.-Am.*). — Lake Athabaska: near Sand Pt., no. 4479; N. shore of Ellis Bay, no. 6120; near base of Cornwall Bay, no. 6429; east end, *J. W. Tyrrell*, no. 17009(O). Great Slave L.: Resolution, *Onion*, *Kennicott & Hardisty* (N); Taltheilei Narrows, no. 1241; Windy Pt., *Hume*, no. 102679(O); Old Ft. Rae, *Russell* (O).

BORAGINACEAE

Lappula Redowskii (Hornem.) Greene var. *occidentalis* (Wats.) Rydb. — Occasional to common about settlements, and inland in the Wood Buffalo Park. The note in *Fl. Bor.-Am.*, "Cumberland House to Bear Lake," under *Echinosperrum patulum*, and the same in *Macoun's*

Cat. under *E. Redowskii* var. *occidentale*, probably refer to this species. — Chipewyan, nos. 6063, 6066, Ft. Smith, *Seton & Preble*, no. 78385(O).

Hackelia deflexa (Wahl.) Opiz. var. ***americana*** (Gray) Fern. & Johnston. — *Lappula americana* (Gray) Rydb. — *Hackelia deflexa* (Wahl.) Opiz of Am. auth. — See Rhod. 26: 124 (1924). — Known in the Mackenzie basin from a single collection in a cabin clearing along the Upper Slave River. — 30th base line district, Slave River, no. 3200.

Mertensia paniculata (Ait.) Don. — See Contr. Gray Herb. n. ser. 48: 1-20 (1916). — Common in open woods, prairies and cabin clearings northward to Great Slave Lake, and known on the Mackenzie (*Onion*, N). It has not been found east of the Paleozoic boundary. — Waterways, no. 3206; Calumet, Athabaska R., no. 1243; along lower Firebag R., no. 6033-a; along the Quatre Fourches R., no. 1244; Gov. Hay Camp, Slave R., nos. 3208, 3209; Hay R., Great Slave L., *Hume*, no. 102680(O).

LABIATAE

Scutellaria epilobiifolia Hamilton. — *S. galericulata* Amer. auth., not L. — See Rhod. 23: 86 (1921). — Common in wet meadows northward to the Wood Buffalo Park, and at least occasional to the Mackenzie (*Onion*, N; *Ross*, N; *Kennicott*, N), but not known very far east of the Paleozoic boundary. — Shelter Pt., L. Athabaska, nos. 1250, 1251; E. shore of L. Mamawi, no. 3186; Upper Slave R. lowland, nos. 3190, 3191; S. W. and N. shores of Great Slave L., *Howe*, no. 91955 (O).

Dracocephalum parviflorum Nutt. — *Moldavica parviflora* (Nutt.) Britton. — Common in dry openings and clearings northward at least to the Wood Buffalo Park, and known on the Mackenzie (*Onion*, N). It is abundant as a "fireweed" in new burns, and appears to be rare or occasional east of the Paleozoic boundary. — Near base of Cornwall Bay, L. Athabaska, no. 6430; Resolution, *Kennicott* (N); "Between Bear Lake and Cumberland House," *Richardson* (G).

Agastache Foeniculum (Pursh) Ktze. — *Lophanthus anisatus* Benth. — Noted in Fl. Bor.-Am. north "to Fort Franklin on the Mackenzie River," and in Macoun's Cat. "north to Lake Athabaska." It is apparently rare northward and the writer has seen only the following material. — McMurray (growing as a roadside weed), nos. 7081, 7116; Resolution, *Kennicott* (N).

Physostegia parviflora Nutt. — *Dracocephalum Nuttallii* Britton. — Known thus far in the Mackenzie basin only in the delta low-

lands west of Lake Athabaska and along the Upper Slave River, where it is rather common at willow slough margins and on low mud flats. — East shore of L. Mamawi, nos. 3183, 4401; Murdock Cr. district, no. 3184; Gov. Hay Camp district, Slave R., no. 3185.

GALEOPSIS TETRAHIT L. — Introduced in the southern districts, where it grows in waste places. — Waterways, no. 3198.

Stachys scopulorum Greene. — Common in prairies and at the drier margins of sloughs northward to the Wood Buffalo Park, and at least occasional on the Mackenzie (*Onion, Kennicott & Hardisty*, N) (N. E.). Not known far eastward of the Paleozoic boundary. Noted in Fl. Bor.-Am. as extending to Ft. Franklin, and by Harper at Tsu Lake, both under *S. palustris*. — McMurray, no. 7054; lower delta of Athabaska R., no. 1248; Shelter Pt., L. Athabaska, no. 1249; E. shore of L. Mamawi, nos. 3170, 4397; Upper Slave R. lowland, nos. 3178, 3180, 3181; Resolution, *Onion, Kennicott & Hardisty* (N) (N. E.).

Monarda mollis L. var. *menthaefolia* Fern. — See Rhod. 3: 15 (1901). — Common or occasional in dry prairies in the Wood Buffalo Park and southwestward.

Lycopus uniflorus Michx. — Known in the Mackenzie basin only on the south side of Lake Athabaska, where it is abundant at the margins of sandy ponds. — Ponds about 5 mi. S. E. of Wolverine Pt., nos. 6822, 6825; 2 mi. W. of Ennuyeuse Creek, nos. 6978, 6984.

Mentha canadensis L. var. *glabrata* Benth. — *M. arvensis* L. var. *glabrata* (Benth.) Fern. — Common in sloughs, wet meadows, and on stream margins northward to the Mackenzie (*Onion*, N; *Miss E. Taylor*, O), but not extending far eastward from the Paleozoic boundary. Plants noted in the Tazin basin by Harper under *M. glabrior* probably belong here. — McMurray, no. 7061; lower delta of Athabaska R., no. 1247; Shelter Pt., L. Athabaska, nos. 1245, 1246; E. shore of L. Mamawi, nos. 3168, 4399; upper Slave R. lowland, nos. 3163, 3164; N. W. shore of Great Slave L., *Bedford* (O).

SCROPHULARIACEAE

Limosella aquatica L. — Noted by John Macoun "on mud flats on the Lower Peace River and at Fort Chipewyan," but unknown elsewhere in the Mackenzie basin except for the following. — Damp sand at margin of beach lagoon, Sand Pt., L. Athabaska, no. 4569.

Veronica americana Schwein. — Noted in Macoun's Cat., "northward to Lake Athabaska," but the writer has seen no material from beyond the lower Athabaska River. Occasional in wet meadows and on wet river banks in the southwestern part of the Mackenzie basin. — Calumet, Athabaska R., no. 1255.

Veronica scutellata L. — Occasional or common in wet sloughs northward at least to Great Slave Lake, but not known far east of the Paleozoic boundary. — Government Hay Camp district, Slave R., no. 3148; near Ft. Smith, no. 1252; N. W. shore of Great Slave L., *Bedford* (O).

Veronica peregrina L. var. **xalapensis** (HBK.) Pennell. — *V. xalapensis* HBK. — See Torreya, 19: 167 (1919). — Occasional or common on damp shores, in rock crevices, wet meadows and open prairies northward at least to the western part of Lake Athabaska, and to the Wood Buffalo Park. Noted in Fl. Bor.-Am. (under *V. peregrina*) "Throughout Canada to the Mackenzie River." — Lake Athabaska: Chipewyan, no. 4700; Shelter Pt., nos. 1253, 1254. East shore of L. Mamawi, no. 3146.

Euphrasia subarctica Raup. — See Rhod. 36: 87-8 (1934). — Occasional in damp mossy crevices and muskegs about the north side of Lake Athabaska, and known at the eastern end of Great Slave Lake. The record for *E. officinalis* in Fl. Bor.-Am., "Canada and Newfoundland, to lat. 64° N," probably includes this species in the northwest. — Lake Athabaska: near Sand Pt., no. 4633 (Type); base of Cornwall Bay, no. 6612; Clut L., near E. end of L. Athabaska, *Campbell*, no. 132401(O). Fairchild Pt., Great Slave L., no. 1266.

Castilleja Raupii Pennell. — *C. pallida* of most auth. — See Proc. Acad. Nat. Sci. Phila. 86: 528-31 (1934). — Occasional to common in upland woods, the willow margins of wet meadows and streams, and on sandy lake shores. — Calumet, Athabaska R., no. 1260. Lake Athabaska: Sand Pt., no. 4562; N. E. shore of Ellis Bay, no. 6126; near mouth of Charlot R., nos. 6318, 6351; W. shore of Ellis Bay, no. 6371. 30th base line district, Slave R., no. 1258; Ft. Smith, no. 1261; and *Seton & Preble*, no. 78386(O) (*C. pallida* var. *septentrionalis* of Seton's list); Lower Slave R., no. 1262. Great Slave L.: Caribou Isl., *Seton & Preble*, no. 78387(O) (*C. pallida* var. *septentrionalis* of Seton's list); Keith Isl. and vicinity, nos. 1257, 1264; Taltheilei Narrows, no. 1263; Maufelly Pt., no. 1265; Fairchild Pt., no. 1259; S. W. and N. shores, *Howe*, no. 91957(O); Windy Pt., *Hume*, no. 102682(O); Pine Pt., *Brook* (O); near Ft. Rae, *Russell* (O); Hay R., *Preble & Carey*, no. 16 (W) (N. E.).

Orthocarpus luteus Nutt. — Known in our region only in dry prairies at Peace Point, in the Wood Buffalo Park.

Rhinanthus Kyrollae Chab. — Occasional on the north shore of Lake Athabaska and in the Wood Buffalo Park, growing in damp thickets. Richardson noted *R. Crista Galli* "to the shores of the Slave Lake,

and to Fort Franklin," and Harper has a record for *R. oblongifolius* at the "Mouth of Taltson River," but whether these are all referable to the above is uncertain. The group is poorly understood and badly in need of further material and study. — Lake Athabaska: Shelter Pt., no. 1267; Fishhook Bay, no. 6584 ?.

Pedicularis labradorica Houttuyn. — See Rhod. 33: 193 (1931). — Occasional to common in woods, muskegs and rock crevices about Great Slave Lake, but apparently rare in the Wood Buffalo Park and on Lake Athabaska. Known on Great Bear Lake (*J. M. Bell*, O) and the lower Mackenzie (*Miss E. Taylor*, O). — Great Slave L.: Talttheilei Narrows, no. 1271; Maufelly Pt., no. 1269; Fairchild Pt., nos. 1270, 1272, 1273, 1274; Ft. Reliance, no. 1268; Windy Pt., *Hume*, no. 102681(O); N. W. shore, *Bedford* (O); Ft. Rae, *Russell* (O). Artillery L., *Seton & Preble*, no. 78579(O).

Pedicularis lanata Cham. & Schlecht. — An arctic and alpine species known in our region only in the Lockhart basin. — Artillery L., *J. W. Tyrrell*, no. 23119(O) (*P. Langsdorffii* var. *lanata* of Tyrrell's list).

Pedicularis lapponica L. — Known in our region only on the northeastern height of land. — Portage between Clinton-Colden L. and the Thelon R., *J. W. Tyrrell*, no. 23117(O) (*P. euphrasioides* in Tyrrell's list).

Pedicularis parviflora Smith. — Known in the Mackenzie basin from a single locality near the south shore of Lake Athabaska. — Margin of wet muskeg about 3 mi. W. of Ennuyeuse Creek, nos. 6965, 6968.

Melampyrum lineare Lam. — Common in dry sandy woods about Lake Athabaska, and probably common in similar situations southward. — Vicinity of Athabaska Landing, *Brinkman*, no. 4063(N). Lake Athabaska: Shelter Pt., nos. 1276, 4465; 5 mi. E. of Poplar Pt., nos. 6688, 6700; 2 mi. W. of Ennuyeuse Cr., no. 6937.

OROBANCHACEAE

Boschniakia rossica (Cham. & Schl.) Hulten. — See Kgl. Sv. Akad. Handl. Ser. 3, 8. No. 2: 126 (1930). — Occasional to common about Great Slave Lake, in mossy woods. The Fairchild Point specimens come from clumps of *Alnus viridis*. Known also on the lower Mackenzie (*Dutilly*, G; *Miss E. Taylor*, O), and noted by Richardson at Ft. Franklin. — Great Slave L.: *R. Bell*, no. 23149(O); Fairchild Pt., nos. 1277, 1278, 1279.

LENTIBULARIACEAE

Pinguicula vulgaris L. — Common about Great Slave Lake, and known at Great Bear Lake (*J. M. Bell*, O) and on the lower Mac-

kenzie (Miss E. Taylor, G, O). It grows in damp mossy crevices. — Great Slave L.: *Richardson* (G); Keith Isl., no. 1282; Taltheilei Narrows, no. 1281; base of Maufelly Pt., no. 1280; S. W. and N. shores, *Howe*, no. 91956(O); N. W. shore, *Bedford* (O); Ft. Rae, *Russell* (O).

Pinguicula villosa L. — An arctic and alpine species known in our region about the eastern arm of Great Slave Lake and on the north side of Lake Athabaska. It grows on mossy hummocks in muskegs. — Charlot Pt., L. Athabaska, no. 6307. Great Slave L.: Caribou Isl., *Seton & Preble*, no. 78292(O); Taltheilei Narrows, no. 1285; N. shore of McLeod Bay, near Hoarfrost R., no. 1283; Fairchild Pt., nos. 1284, 1286.

Utricularia vulgaris L. — Common to abundant in shallow lakes and sluggish streams northward at least to Great Slave Lake. — Cree (Mamawi) Cr., Athabaska delta, no. 3139. Lake Athabaska: pond near base of Cornwall Bay, no. 6624; 2 mi. W. of Ennuyeuse Cr., no. 7004. Grande Detour Portage, lower Slave R., *Russell*, no. 74(G). Great Slave L.: Yellowknife Bay, no. 1291; N. W. shore, *Bedford* (O); Ft. Rae, *Russell* (O).

Utricularia minor L. — Probably common at shallow lake margins northward at least to Great Slave Lake, though not extensively collected. — Lake Athabaska: William Pt., no. 6860; 2 mi. W. of Ennuyeuse Cr., no. 7003. Great Slave L.: Fairchild Pt., no. 1292.

Utricularia intermedia Hayne. — Occasional or common at shallow pond margins about Athabaska and Great Slave Lakes. Noted in Fl. Bor.-Am. from Lake Huron "to Bear Lake," and by Harper in a "muskeg pond near Athabaska River, 10 miles below McMurray." — Lake Athabaska: Charlot R., near its mouth, no. 6365; 5 mi. S. E. of Wolverine Pt., no. 6826; William Pt., nos. 6858, 6859. Great Slave L.: Fairchild Pt., nos. 1288, 1290; Bell Isl., Charlton Bay, no. 1289; Yellowknife Bay, no. 1287.

PLANTAGINACEAE

Plantago major L. var. *asiatica* Decaisne. — Common on river banks and in damp meadows northward at least to the Wood Buffalo Park, but not extending far east from the Paleozoic boundary. Noted in Fl. Bor.-Am. (as *P. major*) from "Lake Huron . . . to lat. 68." — McMurray, no. 7064; Calumet, Athabaska R., no. 1296; Reed Portage, upper Athabaska delta, no. 3132; Shelter Pt., L. Athabaska, nos. 1293, 4435; Upper Slave R. lowland, nos. 1295, 3134, 3135; Ft. Smith, no. 1294.

Plantago eriopoda Torr. — Common on saline flats in the Wood

Buffalo Park and southwestward. The record in Macoun's Cat., "northward to the Arctic Sea" probably refers in part to *P. septata* Morris, a species of the lower Mackenzie.

Plantago oliganthos R. & S. — See Rhod. 27: 93 (1925). — Known in the Mackenzie basin only on salt flats west of the Upper Slave River.

RUBIACEAE

Galium boreale L. — Common to abundant in dry open woods, prairies and clearings northward to the Mackenzie (*Miss E. Taylor*, O; *Onion, Kennicott & Hardisty*, N), but very little known east of the Paleozoic boundary. Harper noted it on the Taltson River at Twin Gorges and below Tethul R., and on the Athabaska River at Pelican Portage, but no specimens are available. — Calumet, Athabaska R., no. 1305; Shelter Pt., L. Athabaska, no. 1306; E. shore of L. Mamawi, no. 3112; along Quatre Fourches R., no. 1303; upper Slave R. lowland, nos. 1302, 3107, 3108; Ft. Smith, no. 1304. Great Slave L.: Sulfur Bay, *Hume*, no. 102685(O); N. W. shore, *Bedford* (O); Old Fort Rae, *Russell* (O).

Galium trifidum L. — Common in sloughs and damp meadows northward at least to Lake Athabaska and the Wood Buffalo Park. Richardson's record for *G. Claytoni*, "as far north as lat. 68°" probably refers to this species. — Lake Athabaska: Shelter Pt., nos. 1297, 1298, 1299; bank of Charlot R. near its mouth, no. 6363; near base of Cornwall Bay, no. 6492; 5 mi. E. of Poplar Pt., no. 6702. Upper Slave R. lowland, nos. 3122, 3126, 3128; Ft. Smith, no. 1304.

Galium triflorum Michx. — Common in damp woods in the lowlands about the western end of Lake Athabaska and southward. — McMurray, no. 7047; and *Dutilly*, no. 111(G); Reed Portage, upper Athabaska delta, no. 3098; Chipewyan, no. 4685; along Quatre Fourches R., no. 1301.

CAPRIFOLIACEAE

Viburnum pauciflorum Raf. — Abundant in open woods northward at least to Great Slave Lake, and known at Great Bear Lake (*J. M. Bell*, O) and on the Mackenzie (*Onion, Kennicott & Hardisty*, N). Back's record for *V. acerifolium*, "Slave River, and Athabaska," probably belongs here, as do also the Mackenzie basin records in Fl. Bor.-Am. for *V. edule* and *V. Oxycoccus*. — McMurray, no. 7111; Calumet, Athabaska R., no. 1330; along lower Firebag R., no. 6018. Lake Athabaska: N. shore, *J. W. Tyrrell*, no. 9548(O); Shelter Pt., nos. 1325, 1329; Charlot Pt., no. 6143; Cornwall Bay, no. 6596; along Archibald R. near its mouth, no. 6757. East shore of L. Mamawi, no. 3084; along

Quatre Fourches R., no. 1327; upper Slave R. lowland, nos. 1322, 3081; Ft. Smith, no. 1324; and *Seton & Preble*, no. 78333(O). Great Slave L.: Resolution, *Kennicott* (N); Taltheilei Narrows, no. 1323; Fairchild Pt., no. 1328; N. W. shore, *Bedford* (O).

Symphoricarpos occidentalis Hook. — Richardson noted this species between latitudes 54° and 64°, but the writer has seen no material from beyond the south shore of Great Slave Lake. It grows in dry prairies and is abundant in parts of the Wood Buffalo Park. It has not been found far east of the Paleozoic boundary. — McMurray, no. 7093; Chipewyan, *Dutilly*, no. 133(G); E. shore of L. Mamawi, no. 3061; Gov. Hay Camp district, Slave R., no. 3064; Resolution, *Kennicott* (N).

Symphoricarpos albus (L.) Blake var. ***pauciflorus*** (Robbins) Blake. — *S. pauciflorus* (Robbins) Britton. — *S. racemosus* Michx. var. *pauciflorus* Robbins. — See Rhod. 16: 119 (1914). — Common to abundant in open, chiefly aspen woods, northward to Lake Athabaska and the Wood Buffalo Park. Most frequent in the Paleozoic or younger regions. — Lac la Biche, no. 6006; McMurray, no. 7103. Lake Athabaska: Chipewyan, no. 7031; near Sand Pt., no. 4670; Charlot Pt., no. 6135. East shore of L. Mamawi, nos. 3075, 3076, 4417; Gov. Hay Camp, Slave R., no. 3072; Ft. Smith, no. 1320.

Linnaea borealis L. var. ***americana*** (Forbes) Rehder. — *L. americana* Forbes. — Common in rich woods throughout our region, and northward to Great Bear Lake (*J. M. Bell*, O) and the lower Mackenzie (*Miss E. Taylor*, G). Noted by Seton on Aylmer Lake, in the Barren grounds. — Calumet, Athabaska R., nos. 1312, 1314. Lake Athabaska: Shelter Pt., nos. 1313, 1315; Charlot Pt., no. 6275. Along the Quatre Fourches R., no. 1307; Gov. Hay Camp district, Slave R., no. 3053; Ft. Smith, no. 1311; and *Miss E. Taylor*, no. 9572(O); Cascade Portage, Slave R., *Onion, Kennicott & Hardisty* (N). Great Slave L.: near Caribou Isl., *Seton & Preble*, no. 78335(O); Taltheilei Narrows, no. 1316; base of Maufelly Pt., no. 1309; Fairchild Pt., nos. 1308, 1310; Yellowknife Bay, no. 1317; Windy Pt., *Hume*, no. 102684(O); S. W. and N. shores, *Howe*, no. 91954(O); N. W. shore, *Bedford* (O); Old Fort Rae, *Russell* (O).

Lonicera glaucescens Rydb. — Common in open upland woods northward in the Paleozoic or younger country to the Wood Buffalo Park, and occasional on Lake Athabaska. — McMurray, *Dutilly*, no. 113(G); Calumet, Athabaska R., no. 1319; Lake Athabaska: Charlot Pt., no. 6292; near base of Cornwall Bay, no. 6504. East shore of L. Mamawi, no. 3088; Ft. Smith, no. 1318; and *Miss E. Taylor*, no. 9658(O); and *Seton & Preble*, no. 78334(O).

Lonicera involucrata (Richards.) Banks. — *Distegia involucrata* (Richards.) Cockerell. — Richardson noted this species between lat. 54° and 64°, but the northernmost specimens seen by the writer are from Lac la Biche. Preble noted it "on the banks of the Athabaska," but no farther northward. — Lac la Biche, nos. 3097, 6008; "Rocky woods, between lat. 54°-64°," *Richardson* (O).

ADOXACEAE

Adoxa Moschatellina L. — Definitely known in our region only in the extreme southern part, along the Athabaska River. Noted by Richardson, however, in the "wooded country, lat. 54°-64°." — Athabaska R., near Cascade Rapids, *Miss E. Taylor* (G, N, O); Athabaska R., lat. 56°, *J. M. Macoun*, no. 9484(O).

VALERIANACEAE

Valeriana septentrionalis Rydb. — *V. sylvatica* Banks. — Occasional in upland muskeg thickets in the Wood Buffalo Park. Noted by Richardson on the Clearwater River near Methye Portage, but otherwise unknown in our region.

CAMPANULACEAE

Campanula rotundifolia L. — Common in open woods, dry prairies, and rocky hills northward at least to the western part of Great Slave Lake. Noted in Fl. Bor.-Am., under *C. linifolia*, as far north as lat. 64°. Mackenzie basin material recorded under *C. petiolata* in Fl. Bor.-Am. is included here. — Calumet, Athabaska R., no. 1332. Lake Athabaska: Shelter Pt., nos. 1334, 1335, 1336, 4425; Sand Pt., nos. 4485, 4536; Charlot Pt., nos. 6290, 6404; island near base of Charlot Pt., no. 6390; Cornwall Bay, no. 6454; hills S. of Wabba L., no. 6474; near Archibald R., S. of Wolverine Pt., no. 6743. East shore of L. Mamawi, no. 3048; along the Quatre Fourches R., no. 1331; Gov. Hay Camp district, Slave R., no. 3045. Great Slave L.: S. W. and N. shores, *Howe*, no. 91953(O); Windy Pt., *Hume*, no. 102683(O); N. W. shore, *Bedford* (O); Ft. Rae, *Russell* (O).

LOBELIACEAE

Lobelia Kalmii L. — Apparently rare in the Mackenzie basin, and known only from the following records. Noted by Richardson in saline marshes in lat. 60°. — Sandy muskeg, N. arm of Great Slave L., *Hume*, no. 102686(O).

COMPOSITAE

Grindelia perennis A. Nels. — *G. squarrosa* (Pursh) Dunal ex Torr. & Gray. — See Ann. Mo. Bot. Gard. 21: 485-8 (1934). — Com-

mon on the Salt Plain prairies west of the Slave River, but not known elsewhere in our region. Noted in Fl. Bor.-Am., under *Donia squarrosa* Pursh, in the "woody country between lat. 54°–64°," but the writer has seen no material from beyond the Wood Buffalo Park.

***Solidago multiradiata* Ait.** — An arctic and alpine species the typical form of which is known in our region only on Great Slave Lake where it grows on rocky hills or on sandy or stony plains and beaches. At least a part of the material referred to under *S. Virgaurea*, "woody country between lat. 54° and 64°," in Fl. Bor.-Am. probably belongs here. — Great Slave L.: Taltheilei Narrows, no. 1365; Fairchild Pt., nos. 1362, 1363, 1364; Ft. Reliance, no. 1366; N. W. shore, *Bedford* (O).

***Solidago multiradiata* Ait. var. *scopulorum* Gray.** — Common in clearings and in damp woods and thickets in the Wood Buffalo Park, but not known east of the Paleozoic boundary nor north of Resolution. — Lower Athabaska R., *Kennicott* (N); Government Hay Camp district, Slave R., nos. 3265, 3266; Resolution, *Onion*, *Kennicott & Hardisty* (N).

***Solidago decumbens* Greene var. *oreophila* (Rydb.) Fern.** — *S. oreophila* Rydb. — See Rhod. 38: 202–4 (1936). — Common in dry prairies, clearings, and on sandy or rocky shores and upland woods northward to Lake Athabaska and the Wood Buffalo Park. It is known also on the south shore of Great Slave Lake and on the Lower Mackenzie (*Miss E. Taylor*, O). Material noted in Fl. Bor.-Am. under *S. stricta*, and in Macoun's Cat. under *S. humilis*, "Woody country between lat. 54° and 64°," probably belongs here. — Calumet, Athabaska R., no. 1370. Lake Athabaska: Chipewyan, no. 7024; Shelter Pt., nos. 1368, 1369, 4467; Sand Pt., nos. 4491, 4578, 4599, 4640; rocky point at N. W. entrance to Black Bay, no. 6413; Cornwall Bay, no. 6533; 2 mi. E. of Wolverine Pt., no. 6710; 4 mi. S. E. of Wolverine Pt., no. 6792. Government Hay Camp district, upper Slave R., no. 3255; Ft. Smith, no. 1367 (*Mrs. Conibear* coll.); Resolution, *Onion*, *Kennicott & Hardisty* (N).

***Solidago nemoralis* Ait. var. *decemflora* (DC.) Fern.** — See Rhod. 38: 224–7 (1936). — Known in the Mackenzie basin from two collections on Lake Athabaska, where it inhabits dry rocky and sandy uplands. — Near Archibald R., S. of Wolverine Pt., no. 6744; Chipewyan, no. 7023.

***Solidago lepida* DC. var. *elongata* (Nutt.) Fern.** — *S. elongata* Nutt. — *S. canadensis* of auth., in part. — See Rhod. 17: 8–10 (1915). — Common in clearings, open woods, and prairies northward

at least to the Wood Buffalo Park, and known on the upper Mackenzie (*Miss E. Taylor*, O), but apparently extending only a short distance east of the Paleozoic boundary. Records in Fl. Bor.-Am. and Macoun's Cat. under *S. canadensis*, *S. elongata*, and *S. procera*, with notations, "from Slave Lake to Fort Franklin," and "wooded country between lat. 54° and 64°," probably belong here for the most part. — McMurray, nos. 7051, 7066; Calumet, Athabaska R., no. 1359. Lake Athabaska: Chipewyan, no. 7042; Shelter Pt., nos. 1358, 1360, 1361; Sand Pt., no. 4639. East shore of L. Mamawi, no. 3275; Great Slave L., *Richardson* (G).

Solidago lepida DC. var. ***fallax*** Fern. — See Rhod. 17: 8-10 (1915). — Apparently occasional in the river lowlands where it inhabits damp meadows. — East shore of L. Mamawi, no. 4402; Gov. Hay Camp district, Slave R., nos. 3280, 3282; lower Slave R., no. 1357; Resolution, *Kennicott* (N).

Solidago graminifolia (L.) Salisb. var. ***camporum*** (Greene) Fern. — *Euthamia camporum* Greene. — See Rhod. 17: 12 (1915). — Occasional on damp sandy or muddy shores northward to Lake Athabaska. Records in Fl. Bor.-Am. and Macoun's Cat., "north to lat. 64°," under *S. lanceolata* probably belong here, but the writer has seen no material from so far north. — McMurray, no. 7071. Lake Athabaska: Shelter Pt., nos. 1355, 1356; Sand Pt., nos. 4475, 4547; 5 mi. S. E. of Wolverine Pt., no. 6816. Hay (Prairie) R., no. 3263.

Aster Richardsonii Spreng. — See Contr. Arnold Arb. 6: 202-4 (1934). — Common on sandy and stony shores about Great Slave Lake, but otherwise not definitely known in our region. It is common northward to the Arctic, and on the upper Peace River, particularly in the Rocky Mountains. Harper noted it at the Grand Rapids of the Athabaska, but no specimen is available. — Great Slave L.: *R. Bell*, no. 23159(O); Caribou Isl., *Seton & Preble*, no. 78336(O) (*A. sibiricus* of Seton's list); Keith Isl., no. 1350; Yellowknife, *Russell* (O); Ft. Rae, *Russell* (O); S. W. and N. shores, *Howe*, no. 91990; N. W. shore, *Bedford* (O).

Aster conspicuus Lindl. — Common in upland woods in the McMurray district and in the southwestern parts of the Wood Buffalo Park. — McMurray, no. 7088.

Aster modestus Lindl. — Known in this region only in the upper Athabaska delta. — Reed Portage, no. 3213.

Aster Lindleyanus T. & G. — Common in open woods and clearings northward to Lake Athabaska and the Wood Buffalo Park, and known on Great Slave Lake; but apparently occasional in the pre-

Cambrian regions. Records in Fl. Bor.-Am. under *A. paniculatus*, "Slave Lake," and under *A. praecox*, "Fort Franklin," are probably referable to this species or some form of it. — McMurray, no. 7087; Reed Portage, Athabaska delta, no. 3239. Lake Athabaska: Chipewyan, nos. 4674, 7025, 7026; Cornwall Bay, nos. 6518, 6608-a. Government Hay Camp district, Slave R., nos. 3245, 3246, 3248, 3249; near upper Smith Rapids, no. 1354; Ft. Smith (*Mrs. Conibear*, coll.) no. 1353; Resolution, *Kennicott* (N); Great Slave L., *Howe*, no. 91065(O).

Aster Lindleyanus T. & G. var. *comatus* Fern. — Apparently rare or occasional, and possibly not worthy of varietal rank. It has been found along the Peace River in the Wood Buffalo Park, and on the Mackenzie River (*Kennicott*, N).

Aster Lindleyanus T. & G. var. *ciliolatus* (Lindl.) Gray. — Known in this region only from Great Slave Lake specimens cited in Fl. Bor.-Am. under *A. ciliolatus*. — Great Slave L.: *Richardson* (G).

Aster laevis L. var. *Geyeri* Gray. — Known only in the southern and southwestern parts of the Mackenzie basin where it inhabits dry prairies and upland woods, and extends northward to the Wood Buffalo Park. — McMurray, no. 7080; Chipewyan, no. 4674-a; E. shore of L. Mamawi, no. 4396.

Aster ericoides L. — *A. multiflorus* Ait. — See *Rhod.* 28: 65 (1926), and 32: 136–40 (1930). — A species of dry prairies and bluffs, known in our region only in the Wood Buffalo Park where it is rather common. — Government Hay Camp district, Slave R., no. 3227.

Aster junceus Ait. — Common to abundant on stream banks and in damp meadows northward at least to the Wood Buffalo Park, and known on Great Slave Lake and the Mackenzie (*Kennicott*, N). It is apparently rare east of the Paleozoic boundary. Records made by Harper under *S. salicifolius* on the Athabaska River and near Salt River probably belong here. Rydberg set up a new species, *A. Franklinianus* (in *Bull. Torrey Bot. Club*, 37: 141, 1910), to include the Mackenzie basin specimens of this complex to which he had access (those of *Richardson* and *Kennicott*). With more abundant material, however, the writer has been unwilling to separate them, for the present at least, from the wide-ranging *A. junceus*. — McMurray, nos. 1352, 7067, 7070; Sand Pt., L. Athabaska, no. 4545; E. shore of L. Mamawi, nos. 3217, 3218, 3219, 4409; upper Slave R. lowland, nos. 3220, 3221, 3223; near upper Smith Rapids, no. 1351; Resolution, *Onion*, *Kennicott & Hardisty* (N); Great Slave L., *Richardson* (G, N) (*A. laxifolius* of Fl. Bor.-Am.); Ft. Rae, *Russell* (O).

Aster puniceus L. — Common in clearings and wet meadows in the great river lowlands, but not known elsewhere in the Mackenzie basin except possibly in the southwestern sections. — Reed Portage, upper Athabaska delta, no. 3214; Murdock Cr. district, no. 3215; Gov. Hay Camp, no. 3216.

Aster pauciflorus Nutt. — Known in the Mackenzie basin only on the Salt Plain prairies west of the upper Slave River.

Aster falcatus Lindl. — Apparently rare in the Mackenzie basin, growing on dry banks and rocky hills. Material noted in Fl. Bor.-Am. under *A. ramulosus*, "Saskatchewan to Fort Franklin on the Mackenzie River," probably belongs here at least in part. The species is very poorly represented in American herbaria, and is greatly in need of further study. It was collected on the Mackenzie by *Onion and Ross* (N). — McMurray, no. 7069; Chipewyan, no. 4684.

Erigeron acris L. var. **asteroides** (Andrz.) DC. — *E. droebachensis* O. Muell. — See Rhod. 12: 225 (1910). — Common in clearings, damp meadows, and on stream margins northward at least to Lake Athabaska and the Wood Buffalo Park. Noted in Fl. Bor.-Am., under *E. glabratus*, "from the Saskatchewan to Fort Franklin . . .," but the writer has seen no material from beyond Great Slave Lake. — Reed Portage, upper Athabaska delta, no. 3300. Lake Athabaska: Shelter Pt., no. 1346; hill S. of Wabba L., no. 6475; hill country N. E. of Cornwall Bay, no. 6532; mouth of Archibald R., no. 6773. Government Hay Camp, Slave R., nos. 3296, 3297; near upper Smith Rapids, no. 1345; N. W. shore of Great Slave L., *Bedford* (O).

Erigeron acris L. var. **arcuans** Fern. — See Rhod. 28: 236 (1926). — Common or occasional in muskegs and at wet slough margins throughout the region and far northward on the Mackenzie (*Onion*, N; *Miss E. Taylor*, O). — Lake Athabaska: mouth of Charlot R., no. 6340; muskeg N. of Cornwall Bay, no. 6531. Fort Smith, *Miss E. Taylor* (N); Fairchild Pt., Great Slave L., nos. 1337, 1338, 1339.

Erigeron acris L. var. **debilis** Gray. — See Rhod. 12: 225 (1910). — Apparently rare in the Mackenzie basin, and known from a single locality on Great Slave Lake. — Muskegs, Fairchild Pt., nos. 1347, 1348.

Erigeron lonchophyllus Hook. — Apparently rare or occasional in semi-open prairies and clearings in the Wood Buffalo Park and southward.

Erigeron compositus Pursh var. **trifidus** (Hook.) Gray. — See Contr. Gray Herb. 49: 72-9 (1917); Univ. Wyo. Pub. Bot. 1: 172-86 (1926); Rhod. 30: 122-3 (1928). — An arctic and alpine species,

known in our region only at the eastern end of Great Slave Lake, where it grows on shingle beaches. — Fairchild Pt., Great Slave L., no. 1340.

Erigeron glabellus Nutt. — Common on dry prairies in the Wood Buffalo Park and southwestward, and at least occasional far northward in the Mackenzie country (*Miss E. Taylor*, O; ?*Kennicott*, N). Mackenzie basin records under *E. pulchellus* in Fl. Bor.-Am., "Woody country, from Canada to lat. 64°" probably belong here. — Resolution, *Kennicott* (N).

Erigeron philadelphicus L. — Common in damp meadows and on river flood plains northward in the Paleozoic or younger country to the Wood Buffalo Park, and known on the Mackenzie (*Miss E. Taylor*, G; *Kennicott*, N). Notes in Fl. Bor.-Am. under *E. philadelphicus* and *E. purpureus*, "Woody country between lat. 54° and 64°," and "From Lake Huron . . . to the Arctic Circle," are referable here for the most part. — Calumet, Athabaska R., nos. 1341, 1343; E. shore of L. Mamawi, no. 3308; upper Slave R. lowland, nos. 1342, 3311; lower Slave R., no. 1344; "Athabasca and north," *Richardson*, no. 11177(O).

Erigeron canadensis L. — *Leptilon canadense* (L.) Britton. — Apparently rare or occasional in the Mackenzie basin, and known thus far only on granite hills about the western end of Lake Athabaska. — Chipewyan, no. 7039; E. shore of L. Mamawi, no. 3307.

Erigeron hyssopifolius Michx. — Occasional in damp thickets in the Wood Buffalo Park, and northward to Great Bear Lake (*J. M. Bell*, O) and the Mackenzie (*Onion & Ross*, N). Unknown east of the Paleozoic boundary. *Richardson's* record for *Galatella graminifolia* at Great Slave Lake should be referred here. — 30th base line district, Slave R., no. 1349; Smith Portage, *Miss E. Taylor*, no. 11157(O). Great Slave L.: Pine Pt., *Brooke* (O); Windy Pt., *Hume*, no. 102687 (O); N. W. shore, *Bedford* (O).

Erigeron ramosus (Walt.) B. S. P. — Known in our region only along the upper Slave River and at the western end of Lake Athabaska, where it grows in waste places and on damp muddy shores. — Chipewyan, no. 7041; Gov. Hay Camp district, Slave R., no. 3306.

Antennaria pulcherrima (Hook.) Greene. — Known in our region only from an upland meadow in the Wood Buffalo Park.

Antennaria rosea (D. C. Eat.) Greene. — Common in dry upland woods and prairies northward at least to Great Slave Lake, and known on the lower Mackenzie (*Stringer*, O). — Lake Athabaska: Shelter Pt., no. 1378; Charlot Pt., nos. 6243, 6279; Fishhook Bay, no. 6585. Fort Smith, no. 1379; lower Slave R., no. 1380. Great Slave L.: *R. Bell*, no. 23160(O); S. W. and N. shores, *Howe*, no. 91995(O); N. W. shore, *Bedford* (O).

Antennaria nitida Greene. — Common in dry woods and prairies northward at least to the upper Mackenzie (*Dutilly*, G). — Lake Athabaska: Shelter Pt., no. 4452; base of Cornwall Bay, no. 6452; hills S. of Wabba L., no. 6472; 4 mi. E. of Wolverine Pt., no. 6802. East shore of L. Mamawi, no. 3317; Government Hay Camp district, Slave R., no. 3320. Great Slave L.: Fairchild Pt., no. 1372; Yellowknife Bay, no. 1371. Parry Falls, Lockhart R., *J. W. Tyrrell*, no. 23176(O)? (*A. exilis* of Tyrrell's list).

Antennaria campestris Rydb. — Occasional in dry prairies and on rocky shores northward to the western part of Great Slave Lake. — Lake Athabaska: Chipewyan, no. 6069; and *Harper*, no. 90115(O); Shelter Pt., no. 1376; Charlot Pt., nos. 6076, 6108, 6283. Great Slave L.: S. W. and N. shores, *Howe*, no. 91996(O).

Antennaria aprica Greene. — Occasional on the north shore of Lake Athabaska, and known on the Peace River (cited under *A. parvifolia* in Contr. Arnold Arb. 6: 210). — Lake Athabaska: Chipewyan, no. 6071; Shelter Pt., no. 1373; Charlot Pt., nos. 6080, 6284.

Antennaria oxyphylla Greene. — Occasional in dry upland woods on the north shore of Lake Athabaska and along the Slave River, but not known elsewhere in the Mackenzie basin. — Lake Athabaska: Shelter Pt., no. 1374; Sand Pt., no. 4549; Cornwall Bay, no. 6464. Ft. Smith, no. 1375.

Gnaphalium uliginosum L. — Apparently rare in the Wood Buffalo Park and about the western end of Lake Athabaska, growing in damp sandy soils. Unknown elsewhere in the Mackenzie basin. — Chipewyan, no. 7016.

Xanthium italicum Mor. — *X. commune* Britton. — See Field Mus. Nat. Hist. Pub. Bot. 4: no. 2 (1919), and Cornell Agr. Exp. Sta. Mem. 92: 414 (1926). — Apparently confined to the southern part of the Mackenzie basin, and known only from the clayey banks of the lower Athabaska River. — McMurray, no. 7075.

Helianthus giganteus L. — Common on river banks about McMurray, but unknown farther north in the Mackenzie basin. — McMurray, nos. 1381, 7068.

Bidens cernua L. — Known in our region only in the Wood Buffalo Park, where it is common on marshy shores. — Reed Portage, upper Athabaska delta, no. 3327; Murdock Cr. district, no. 3328.

ANTHEMIS **COTULA** L. — Known only as a weed about settlements in the southern part of the region. — McMurray, no. 7098.

Achillea sibirica Ledeb. — *A. multiflora* Hook. — See Rhod. 31: 219 (1929). — Common at lowland slough margins and on delta plains

northward at least to the Wood Buffalo Park, and known on the lower Mackenzie (*Onion, Kennicott & Hardisty*, N), but very little known east of the Paleozoic boundary. It was noted at Tsu Lake by Harper. — McMurray, no. 7112; Shelter Pt., no. 1404; E. shore of L. Mamawi, nos. 3368, 4395; upper Slave R. lowland, nos. 1403, 3370, 3371.

Achillea Millefolium L. — Common in prairies, damp meadows and clearings in the Wood Buffalo Park and southward. Also known on Great Bear Lake (*J. M. Bell*, O) and the Mackenzie (*Miss E. Taylor*, O). Eastward in the pre-Cambrian region it appears to be replaced in part at least by *A. borealis*, a closely related form. Owing to the great variation in this species complex certain of the following are placed here provisionally. — Calumet, Athabaska R., no. 1400. Lake Athabaska: Shelter Pt., nos. 1396, 1397; near eastern end, *J. W. Tyrrell*, no. 116957 (O) (var. *nigrescens* of Tyrrell's list). East shore of L. Mamawi, no. 3345; Gov. Hay Camp district, Slave R., nos. 3353, 3357, 3358; Ft. Smith (*Mrs. Conibear* coll.), nos. 1398, 1399. Great Slave L.: Keith Isl., no. 1402; Taltheilei Narrows, no. 1401.

Achillea borealis Bong. — A northern species, clearly represented in our region only on Lake Athabaska, where it grows on rocky or sandy shores and ridges. — Charlot Pt., nos. 6244, 6259; small island near base of Cornwall Bay, no. 6547; William Pt., no. 6857.

Achillea megacephala, sp. nov.

PLATE 199¹

Herba erecta 3–4 dm. alta, rhizomate perenni, caule striato leviter flexuoso arachneoso ad dense lanato; folia caulina 4–8 (plerumque circa 6), 2–12 cm. longa, 3–8 mm. lata, linearia vel oblanceolata, obtusa vel acuta, inferiores in petiolum angustata, omnia basi amplexicaulia, folia basalia 10–15 cm. longa, 6–10 mm. lata, oblanceolata ad linearia in petiolum angustata, folia omnia 2–3 pinnatifida, segmentis ultimis brevibus crassis ovatis, tomento albo lanato fere obscuratis, sed apices exteriorum glabrae saepe fulvo-tinctae in setam albam hyalinam circa 3 mm. longam e basi hyalina excurrentes. Inflorescentia corymbiformis, 3–8 cm. lata; involucria basi rotundata, 5–7 mm. alta (pleraque circa 6–7 mm.), 4–6 mm. lata (pleraque circa 5 mm.); bractee manifeste imbricatae, obtusae vel rotundatae, superiores ad marginem sericeae ad lanatae, costa rigida conspicua hyalina in medio interdum fulvo-tincta, margine late lacerato scarioso interdum tenuiter fulvo-tincto; ligulae circa 5, 2.5–3 mm. longae, 3–3.5 mm. latae, pleraeque trilobatae, albae; capitula circa 25-flora, receptaculo breviter conico, fere alto quam lato; achaenia circa 2 × 0.8 mm., leviter complanata, ad apicem latissima, alba, medio fusco, stipite distincto.

¹PLATE 199. *Achillea megacephala* Raup. Part of type collection from sand dunes southwest of William Pt., Lake Athabaska; no. 6913; details × 2.

On large shifting sand dunes southwest of William Point, Lake Athabaska, Aug. 20, 1935, no. 6913 (Type, G). Number 6890, collected in the same dune area on Aug. 16, 1935, but about 4 miles to the eastward, may also be referred to this species.

The complex series of forms centering around *Achillea Millefolium* L. and its close relatives in America (chiefly *A. borealis* Bong. and the so-called *A. lanulosa* Nutt.) is not well understood, but it is uniform in having involucre which are rather wedge-shaped at the base, and from 3 to 6 mm. high (usually 4–5 mm.). *A. megacephala* differs from these forms in having a larger involucre (seldom under 5 mm. and mostly 6–7 mm.), the base of which is well-rounded when mature. Its leaves most nearly resemble those of the tomentose forms *A. Millefolium* commonly designated *A. lanulosa*. Its showy rays resemble those of *A. borealis*, but the scarious-margined bracts, scarcely tinged with brown, suggest the eastern *A. Millefolium*.

CHRYSANTHEMUM LEUCANTHEMUM L. var. PINNATIFIDUM Lecoq & Lamotte. — Collected thus far only in a cabin clearing in the Wood Buffalo Park.

Tanacetum huronense Nutt. var. **bifarium** Fern. — See Rhod. 37: 333–4 (1935). — Common on sandy beaches on the northwest shore of Lake Athabaska. Noted in Fl. Bor.-Am., under *T. pauciflorum*, as occurring “between lat. 54° and 64°,” but the following are the only specimens seen by the writer. — Lake Athabaska: Shelter Pt., nos. 1382, 1383, 4431; Sand Pt., no. 4490.

Tanacetum huronense Nutt. var. **floccosum**, var. nov. PLATE 200¹

A forma typica differt caulibus floriferis brevioribus (2–4 dm.), et corymbis capitulos 1–6 gerentibus. A var. *bifario* Fern. differt pinnis et pinnulis magis confertis, et tota herba tomento albo floccoso vestita.

Dry sandy upper beach on the south shore of Lake Athabaska near Wolverine Point, July 28, 1935, no. 6719 (Type, G). Another number, 6912, collected in the large dune area southwest of William Point on Aug. 20, 1935, is a good match for the type.

These plants are quite distinctive on account of their heavy white tomentum, and are among the more important dune-fixing plants on the south side of Lake Athabaska. They commonly grow in large clumps with extensively ramifying root systems. Their nearest relationship seems to be with *T. huronense* Nutt. var. *bifarium* Fern.² which

¹PLATE 200. *Tanacetum huronense* Nutt. var. *floccosum* Raup. Part of type collection from a sandy beach near Wolverine Pt., Lake Athabaska, no. 6719. Habit photo taken in sand dune country southwest of William Pt., Aug. 20, 1935.

²See Rhod. 37: 333–4 (1935) for a recent revision of this species complex.

is a few-flowered form of about the same stature and leaf-shape. Variety *bifarium* is common on the sandy northwestern shores of Lake Athabaska.

Artemisia canadensis Michx. — Occasional to common in dry prairies and on sandy or rocky shores and hills. Known on the lower Mackenzie (*Miss E. Taylor*, O). Mackenzie basin records of *A. desertorum* in Fl. Bor.-Am. probably refers to this species. — Calumet, Athabaska R., no. 1394. Lake Athabaska: Chipewyan, nos. 4676, 7030; and *Dutilly*, no. 144(G); Shelter Pt., nos. 1389, 1391; Sand Pt., no. 4556; shore of main lake just W. of Ellis Bay, no. 6265; Charlot Pt., no. 6291; hills of Wabba L., no. 6468; Cornwall Bay, no. 6570; along Archibald R., S. of Wolverine Pt., no. 6732. Fort Smith (*Mrs. Conibear*, coll.), no. 1388. Great Slave L.: Resolution, *Onion*, *Kennicott & Hardisty* (N); Taltheilei Narrows, nos. 1390, 1392; Fairchild Pt., no. 1393; Ft. Reliance, no. 1395.

Artemisia borealis Pall. — Common on dunes and on sandy or gravelly beach ridges in the pre-Cambrian country. — Lake Athabaska: 2 mi. E. of Wolverine Pt., nos. 6709, 6718; near Archibald R., S. of Wolverine Pt., no. 6747; big dunes 5 mi. S. of William Pt., no. 6893; dunes just E. of Ennuyeuse Cr., nos. 6914, 6924. Great Slave L.: Fairchild Pt., nos. 1386, 1387; Ft. Reliance, no. 1385.

Artemisia dracunculoides Pursh. — Occasional or common northward to the Wood Buffalo Park where it grows in dry prairies, but unknown east of the Paleozoic boundary. — McMurray, *Harper*, no. 90118(O).

Artemisia biennis Willd. — Occasional in meadows and clearings, and on stream banks northward to the Mackenzie (*Onion & Ross*, N), but not known in the pre-Cambrian country. — McMurray, no. 7055; Reed Portage, upper Athabaska delta, no. 3343.

Artemisia frigida Willd. — Common on dry river bluffs and rocky hills northward to Lake Athabaska and the Wood Buffalo Park, and known on the lower Mackenzie (*McConnell*, O; *Miss E. Taylor*, O). Noted by Preble at the rapids of the Athabaska. — Lake Athabaska: Chipewyan, *Dutilly*, no. 143(G); Shelter Pt., no. 1384. East shore of L. Mamawi, no. 3335.

Artemisia Tilesii Ledeb. — See Contr. Arnold Arb. 6: 211–12 (1934). — Occasional on river banks and lake shores in the Peace and Athabaska River regions, and on Great Bear Lake (*Richardson*, O; *J. M. Bell*, O) and the lower Mackenzie (*Onion*, N). The writer has seen no material from about Athabaska and Great Slave Lakes. — McMurray, no. 7074; along Athabaska R. below MacKay, no. 6001.

Petasites palmatus (Ait.) Gray. — Common in open woods and at muskeg margins northward at least to Lake Athabaska and the Wood Buffalo Park, and known at Great Bear Lake (*J. M. Bell*, no. 22930, O); muskeg S. of Wabba L., no. 6488; along William R. near its mouth, no. 6897. Fort Smith, no. 1435. Taltheilei Narrows, Great Slave L., no. 1436.

Petasites vitifolius Greene. — Occasional to common in upland muskegs and wet meadows northward to the Mackenzie (*Onion*, N). — Lake Athabaska: hills N. E. of Cornwall Bay, no. 6540. Resolution, *Kennicott* (N)?

Petasites sagittatus (Pursh) Gray. — Abundant in wet meadows and muskegs northward at least to the Wood Buffalo Park, and occasional on Great Slave Lake, but not yet collected on Lake Athabaska. Noted by Richardson "to Fort Franklin." — Government Hay Camp district, Slave R., no. 3415. Great Slave L.: Fairchild Pt., nos. 1433, 1434.

Arnica chionopappa Fern. — See *Rhod.* 35: 336-7 (1933). — Common in dry upland woods throughout the region, and known on the lower Mackenzie (*Dutilly*, G; *Onion*, N). — Lake Athabaska: Shelter Pt., nos. 1411, 1412; Charlot Pt., nos. 6127, 6222, 6231, 6260; Cam-sell Portage, no. 6194; hills N. E. of Cornwall Bay, no. 6519; Fishhook Bay, no. 6577; "Cumberland and Chepewyan," *Richardson* (O) (*A. montana* of Fl. Bor.-Am. in part). Government Hay Camp district, Slave R., no. 3377; Ft. Smith, no. 1408; and *Seton & Preble*, no. 78293 (O) (*A. angustifolia* of Seton's list); lower Slave R., no. 1409. Great Slave L.: Fairchild Pt., nos. 1407, 1410; N. W. shore, *Bedford* (O); Old Fort Rae, *Russell* (O); Windy Pt., *Hume*, no. 102689(O).

Arnica attenuata Greene. — Apparently occasional to common on rocky uplands and shores about Great Slave Lake and northward, but rare on Lake Athabaska. Tyrrell's record for *A. alpina* on Lake Athabaska, probably refers to this species. The note in Fl. Bor.-Am., under *A. montana*, "from the Saskatchewan to the extreme Arctic regions" also probably belongs here at least in part. — Lake Athabaska: small island near base of Charlot Pt., no. 6376. Great Slave L.: Taltheilei Narrows, no. 1406; Fairchild Pt., no. 1405.

Arnica rhizomata A. Nels. — Common at the margins of dry upland prairies in the Wood Buffalo Park, but unknown elsewhere in our region. It has been collected on the Peace River, and a specimen in Herb. N collected by Kennicott somewhere on the Mackenzie has been referred to it somewhat doubtfully.

Senecio eremophilus Richards. — Occasional in lowland clearings

and wet meadows along the upper Slave and lower Athabaska Rivers. Noted by Richardson northward "to Fort Franklin." — Reed Portage, upper Athabaska delta, no. 3391; Gov. Hay Camp district, Slave R., nos. 3392, 3393.

Senecio indecorus Greene. — See Rhod. 26: 120 (1924). — Common in lowland wet meadows and occasional at upland prairie margins in the Wood Buffalo Park, and known far northward in the Mackenzie region (*Richardson*, O; *Onion*, N). Apparently rare or occasional east of the Paleozoic boundary. Part of the material referred to *S. aureus* in Fl. Bor.-Am., Macoun's Cat., and Back's Narrative evidently belongs here. — Lake Athabaska: Shelter Pt., no. 1415; near base of Cornwall Bay. no. 6480. Upper Slave R. lowland, nos. 3387, 3388.

Senecio pauperculus Michx. — See Rhod. 23: 299 (1921). — Common in muskegs, rich woods, and on damp meadows and shores on the north side of Lake Athabaska and in the Wood Buffalo Park, but apparently only occasional northward. The note under *S. Balsamitae* in Fl. Bor.-Am. "Woody country, from lat. 54° to 64°," probably refers to this species in part. — Calumet, Athabaska R., no. 1416. Lake Athabaska: Charlot Pt., nos. 6250, 6377; Cornwall Bay, no. 6546; Fishhook Bay, no. 6583. Upper Slave R. lowland, nos. 3394, 3398; lower Slave R., no. 1417. Great Slave L.: Fairchild Pt., no. 1418.

Senecio cymbalarioides Nutt. var. *borealis* (T. & G.) Greenm. — See Ann. Mo. Bot. Gard. 3: 177 (1916). — Common on dry uplands and shores about Great Slave Lake, and occasional on Lake Athabaska and in the Wood Buffalo Park. Also known on the Mackenzie (*Dutilly*, G; *Onion & Ross*, N). — Lake Athabaska: near Chipewyan, *Harper*, no. 90127(O); N. shore, *J. W. Tyrrell* (O); Charlot Pt., nos. 6086, 6282; Black Bay, *Harper*, no. 90126(O). Fort Smith, nos. 1424, 1429; and *Seton & Preble*, no. 78580(O); and *Miss E. Taylor*, no. 14790(O); Hill Island L., *Harper*, no. 90130(O); Togun R., between Athabaska and Great Slave Lakes, *Harper*, no. 90129. Great Slave L.: Caribou Isl., *Seton & Preble*, no. 78581(O); Taltheilei Narrows, nos. 1423, 1427; base of Maufelly Pt., no. 1428; Fairchild Pt., nos. 1425, 1426, 1430, 1431; Windy Pt., *Hume*, no. 102688(O); S. W. and N. shores, *Howe*, no. 91998(O); N. W. shore, *Bedford* (O).

Senecio palustris (L.) Hook. — Common in lowland sloughs and wet meadows about the western end of Lake Athabaska and northward to the Arctic, but very little known in our region eastward of the Paleozoic boundary. — Reed Portage, upper Athabaska delta, no. 3388; lower delta, no. 1420; Shelter Pt., L. Athabaska, no. 1421; upper Slave R. lowland, nos. 1419, 3384. Great Slave L.: N. W. shore, *Bedford* (O).

Senecio pauciflorus Pursh. — The type of this species came from

Fort Franklin, and the range is given in Fl. Bor.-Am. as "Woody country between lat. 54° and 64°." The writer has seen no material from south of Great Slave Lake. — Great Slave L.: Resolution, *Harper*, no. 90128 (O); Ft. Rae, *Russell* (O).

Cirsium Drummondii T. & G. — Common in prairies and the drier parts of wet meadows in the Wood Buffalo Park, but not known elsewhere in our region. It extends northward to Ft. Franklin (*Richardson*, G), and is known in the northern Rockies. — Upper Slave R. lowland, nos. 1437, 3422.

Saussurea alpina DC. — A record for *S. alpina* var. *remotifolia*, "North of the Saskatchewan to the Bear Lake, in lat. 66° North," occurs in Fl. Bor.-Am., but there is no other evidence of the species in our region except the following. — Stony Island, Great Slave L., *J. W. Tyrrell*, no. 23186 (O) (*S. monticola* of Tyrrell's list.)

Agoseris glauca (Pursh) D. Dietr. — Known in our region only on a muddy shore at the eastern end of Great Slave Lake. Part of the material noted in Fl. Bor.-Am. under *Traximon glaucum* "from lat. 49° northward to the Arctic Coast" probably belongs here. — Fairchild Pt., Great Slave L., no. 1438.

Hieracium canadense Michx. — Common in upland open woods and thickets, and on sandy or rocky shores northward to Great Slave Lake, and known on the Mackenzie (*Onion*, N). An extremely variable species, possibly containing more than one entity, and possibly separate from the eastern *H. canadense*. — Lake Athabaska: Chipewyan, no. 7027; and *Dutilly*, no. 142 (G); Shelter Pt., nos. 1439, 1440, 1441, 1443; Sand Pt., nos. 4546, 4648; Cornwall Bay, no. 6466; beach about 2 mi. E. of Wolverine Pt., no. 6705; William Pt., no. 6856. East shore of L. Mamawi, nos. 3432, 4414; Gov. Hay Camp district, Slave R., nos. 3423, 3424. Great Slave L.: S. W. and N. shores, *Howe*, no. 91997 (O); N. W. shore, *Bedford* (O).

TARAXACUM OFFICINALE Weber. — Occasional as an introduced weed in waste places about settlements. — Chipewyan, no. 6062.

Taraxacum ceratophorum Ledeb.) DC. — See Rhod. 35: 369-86 (1933) for a treatment of this and the following species of *Taraxacum*. — Occasional in open woods, clearings, and rock crevices northward at least to Lake Athabaska and the Wood Buffalo Park. A Mackenzie River specimen (*Onion*, N) has been referred here provisionally. — Lake Athabaska: dolomitic hills N. E. of Cornwall Bay, no. 6524. — Calumet, Athabaska R., no. 1445.

Taraxacum dumetorum Greene. — Occasional in open woods, clearings and prairies northward at least to Great Slave Lake. — Gov. Hay Camp district, upper Slave R., no. 3441; Ft. Smith, no. 1446. —

Great Slave L.: Taltheilei Narrows, no. 1447.

Taraxacum lacerum Greene. — Occasional to common in damp crevices and on gravel beaches among conglomerate rocks on the north shore of Lake Athabaska. A sterile specimen from sandstone rocks at Sand Pt. is referred here provisionally. — Charlot Pt., L. Athabaska, nos. 6232, 6251.

Taraxacum lapponicum Kihlm. — An arctic species known in our region only on the north shore of Lake Athabaska, where it is occasional in crevices in conglomerate rocks. — Charlot Pt., L. Athabaska, no. 6247.

Lactuca pulchella (Pursh) DC. — Common in clearings and on stream banks northward to Great Bear Lake and the Mackenzie (*Richardson*, O, noted under *Sonchus sibiricus* in Fl. Bor.-Am.; *Miss E. Taylor*, O), but not known east of the Paleozoic boundary. — McMurray, no. 7053; Reed Portage, upper Athabaska delta, no. 3433; upper Slave R. lowland, nos. 3434, 3436; lower Slave R., no. 1444.

SONCHUS ARVENSIS L. var. **GLABRESCENS** Guenth., Wimm. & Grab. — See *Rhod.* 12: 145 (1910); 30: 19 (1928). — An introduced weed known only in settlements in the southern part of the region. — Waterways, no. 3448.

LIST OF UNVERIFIED RECORDS

Some of the names noted below were based upon specimens which are known to have been lost, while others are supported by material which the writer has been unable to check. Still another category includes those based upon the ambiguous statements which commonly occur in the earlier works, such as "Cumberland House to Bear Lake." Some of these unverified records are extremely questionable, like the occurrence of *Antennaria plantaginifolia* at Great Slave Lake. Others, such as the report of *Acer spicatum* at Chipewyan, are distinctly worthy of further investigation, particularly since the Athabaska Lake district has proved fruitful of long range extensions from the surrounding regions.

THELYPTERIS CRISTATA (L.) Nieuwl. — "Northward as far as Great Slave Lake" (*Macoun's Cat.*, under *Aspidium cristatum*).

ASPLENIUM TRICHOMANES L. — Clearwater R., near Methye Portage (*Macoun's Cat.*).

LYCOPODIUM ALPINUM L. — White Island, 50 mi. N. of Resolution (*J. W. Tyrrell*).

CALAMAGROSTIS NEGLECTA (Ehrh.) Gaertn. var. **MICRANTHA** (Kearney) Stebbins. — Athabaska Landing (*Hitchcock*, cited by Stebbins, *Rhod.* 32: 55).

CALAMAGROSTIS INEXPANSA Gray var. TYPICA Stebbins. — Athabaska Landing (*Hitchcock*, cited by Stebbins, *Rhod.* 32: 48).

ERIPHORUM GRACILE Koch. — "Saskatchewan to Arctic America" (*Fl. Bor.-Am.*).

SCIRPUS AMERICANUS Pers. — Records under *S. triqueter* in *Fl. Bor.-Am.* and under *S. pungens* in Macoun's *Cat.* may refer to this species: throughout the country "to the Arctic regions."

KOBRESIA BELLARDI (All.) Degl. — A record in *Fl. Bor.-Am.*, "Wooded country. Dr. Richardson," under *Carex affinis*, is doubtfully referred here.

CAREX PRAIREA Dewey. — A record in Macoun's *Cat.*, "northward to Lake Athabasca," under *C. teretiuscula* var. *ramosa* may refer to this species.

CAREX LANUGINOSA Michx. — Methye Portage (*Richardson*, 1845).

CAREX HOUGHTONII Torr. — "Cumberland House to Fort Chipewyan" (*Richardson*, O).

CAREX ROTUNDATA Wahl. — "Slave Lake, and Fort Enterprise" (*Fl. Bor.-Am.*).

TRILLIUM CERNUUM L. var. MACRANTHUM Eames & Wieg. — See *Rhod.* 25: 189 (1923). — "From Saskatchewan to Mackenzie River" (*Fl. Bor.-Am.*). A Richardson specimen in *Herb. G.* is marked "Mackenzie River."

SALIX AMMANIANA Richardson. — A Richardson specimen in *Herb. O* (N. E.) is labeled Slave River. Hooker apparently referred *S. Ammaniana* to *S. Uva-ursi* (*Fl. Bor.-Am.* 2: 152), also a species otherwise unknown in the Mackenzie basin.

SALIX RICHARDSONII Hook. — Pike's Portage and Artillery L. (*J. W. Tyrrell*).

CORYLUS AMERICANA Marsh. — Common on the road a few miles south of Athabaska Landing. "This is its northern limit . . ." (*Preble*).

POLYGONUM COCCINEUM Muhl. — See *Rhod.* 27: 156 (1925). — Records for *P. Muhlenbergii* made by Harper on the Athabaska near Cascade Rapid may refer to this species.

CHENOPODIUM HYBRIDUM L. — "Northward to Bear Lake, Lat. 64" (*Macoun's Cat.*), evidently based on the record in *Fl. Bor.-Am.* under *C. urticum*.

ATRIplex NUTTALLII Wats. — A record in *Fl. Bor.-Am.*, "Salt marshes of the Saskatchewan and of Slave River," under *A. canescens*, may be referable to this species.

SILENE MENZIESII Hook. — "Portage D'Embarras, Slave River" (*Fl. Bor.-Am.*).

DRABA INCANA L. var. CONFUSA (Ehrh.) Liljeb. — See *Rhod.* 36:

315 (1934). — "North in the plains, nearly to the mouth of the Mackenzie River" (*Fl. Bor.-Am.*, under *D. confusa*).

POTENTILLA DISSECTA Pursh. — "Great Slave Lake (*McGill Coll. Herb.*)" (*Macoun's Cat.*).

ASTRAGALUS ABORIGINORUM Richards. — "From Lake Winipeg to the Rocky Mountains and as far north as Bear Lake . . ." (*Fl. Bor.-Am.*, under *Phaca aboriginorum*).

ACER SPICATUM Lam. — Chipewyan (*J. W. Tyrrell*). The writer has searched repeatedly but in vain for this species at Chipewyan and elsewhere on Lake Athabaska.

VIOLA OCHROLEUCA Schwein. — "Woody country, from lat. 54° to 64°. ? *Dr. Richardson*" (*Fl. Bor.-Am.*).

SHEPHERDIA ARGENTEA Nutt. — "Left bank of the Athabaska, below Brule Rapid" (*Seton*).

EPILOBIUM MOLLE Torr. — "In boggy ground, Lake Athabasca" (*Macoun's Cat.*).

OENOTHERA BIENNIS L. — "Athabasca" (*Bot. App. to Back's Narrative*).

GENTIANA PROPINQUA Richards. — "Cumberland House to Bear Lake . . ." (*Fl. Bor.-Am.*).

GENTIANA TENUIS Griseb. — "Cumberland House to Bear Lake" (*Fl. Bor.-Am.*).

SCUTELLARIA LATERIFLORA L. — "Northward to Lake Athabasca" (*Macoun's Cat.*).

LONICERA VILLOSA (Michx.) R. & S. var. ? — A record in *Fl. Bor.-Am.* under *L. caerulea*, "Throughout the wooded country and as far north as lat. 66°" may refer to this species, which occurs in the Lesser Slave Lake district.

SYMPHORICARPOS VACCINOIDES Rydb. — Sterile specimens doubtfully determined thus were collected by the writer along the Quatre Fourches R., no. 1321.

VIBURNUM TRILOBUM Marsh. — Notes under *V. opulus* by Preble, "not observed north of the junction of the Athabaska and the Clearwater. South of this point it is abundant . . .," and by Seton, "along the Athabaska at Fort McKay," may refer to this species.

LOBELIA DORTMANNA L. — Slave Lake and small lake at the summit of Portage La Loche (*Fl. Bor.-Am.*).

EUPATORIUM PURPUREUM L. — "North to the Clearwater River. Lat. 57°" (*Macoun's Cat.*).

SOLIDAGO JUNCEA Ait. — "Woody country between lat. 54° and 64°" (*Fl. Bor.-Am.*).



ALNUS CRISPA var. *ELONGATA* Raup



STELLARIA ARENICOLA Raup



CICUTA MACKENZIEANA Raup



STATICE INTERIOR Raup



ACHILLEA MEGACEPHALA Raup



TANACETUM HURONENSE var. *FLOCCOSUM* Raup

ASTER ANGUSTUS T. & G. — "Slave Lake" (*Fl. Bor.-Am.*, under *Tripolium angustum*); "northward to Lake Athabaska" (*Macoun's Cat.*).

ERIGERON SALSUGINOSUS Gray. — "Salt plains of the Athabasca. Dr. Richardson." (*Fl. Bor.-Am.*, under *Aster salsuginosus*).

ANTENNARIA PLANTAGINIFOLIA Hook. — Great Slave Lake (*Bot. App. to Back's Narrative*, under *A. plantaginea*).

HELENIUM AUTUMNALE L. — "From Lake Huron nearly to the Arctic Circle . . ." (*Fl. Bor.-Am.*).

SENECIO INTEGRIFOLIUS Nutt. — "Woody country, in lat. 54°, to the shores of the Arctic sea" (*Fl. Bor.-Am.*); referred to *S. Hookeri* in Macoun's Cat.

ADDITIONS

The following species were overlooked in the preparation of the first part of the catalogue.

Pinus contorta Loudon var. *latifolia* Engelm. ex Wats. — *P. Murrayana* Balf. — *P. contorta* var. *Murrayana* (Balf.) Engelm. — A cordilleran species known in our region only on the southwestern uplands of the Wood Buffalo Park.

Potamogeton panormitanus Biv. — Known in our region only from an upland lake in the Wood Buffalo Park.

Potamogeton filiformis Pers. var. *Macounii* Morong. — Occasional in shallow lakes and slow streams in the Wood Buffalo Park.

Najas flexilis (Willd.) Rostk. and Schmidt. — Rare or occasional in upland lakes in the Wood Buffalo Park.

SUMMARY OF PLANTS TREATED IN THIS CATALOGUE

	Families	Genera	Species	Vars. and forms	Total number of different plants ¹
Pteridophyta	6	13	36	8	39
Gymnospermae	1	5	8	2	8
Monocotyledoneae	14	67	215	44	227
Archichlamydeae	36	97	262	44	280
Metachlamydeae	22	85	175	33	185
Totals	79	267	696	131	739

HERBARIUM, ARNOLD ARBORETUM,
HARVARD UNIVERSITY.

¹There are 88 species which are represented only by one or more varieties or forms. The figures for the total number of different plants are obtained by subtracting these species from the total number of species, varieties, or forms.

NOTES ON THE LIGNEOUS PLANTS DESCRIBED
BY H. LEVEILLE FROM EASTERN ASIA¹

ALFRED REHDER

POLYGONACEAE²

Polygonum emodi Meisn. var. **dependens** Diels. — Rehder in Jour. Arnold Arb. 10: 184 (1929). — Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 176 (1929). — Steward in Contrib. Gray Herb. 88: 29 (1930).

Polygonum zigzag Léveillé & Vaniot (1908). — Léveillé in Bull. Soc. Bot. France, 57: 447 (1910).

Bistorta zigzag (Lévl.) Gross in Bull. Géog. Bot. 23: 19 (1913).

Polygonum cuspidatum Siebold & Zuccarini in Abh. Akad. Wiss. Muench. 4, pt. 3, p. 208 (Fl. Jap. Fam. Nat. 2: 84) (1846). — Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 185 (1929). — Steward in Contrib. Gray Herb. 88: 97 (1930).

Polygonum yunnanense Léveillé in Fedde, Rep. Spec. Nov. 6: 112 (1908).

CHINA. Y u n n a n : Yunnan-sen, buissons, *F. Ducloux*, no. 539, Aug. 15, 1905 (holotype of *P. yunnanense*; photo. in A. A.).

Polygonum yunnanense seems to have been first identified with *P. cuspidatum* by H. Gross, according to a note on the type specimen dated 1912, where the name is transferred as a variety to *Pleuropterus cuspidatus*, but the varietal combination was apparently never published. Handel-Mazzetti (l.c.) cites *P. yunnanense* Lévl. (1908), non Cat. Pl. Yun-Nan, 208 (1916) as a synonym. Steward does not cite the name, but the type specimen Ducloux 539 under *P. cuspidatum*.

The correct name of the species is *P. cuspidatum* Sieb. & Zucc., for *P. cuspidatum* Willd. ex Sprengel (1825) was published as a synonym of *P. acuminatum* Kunth. Therefore, *P. Zuccarinii* Small (1895) and *P. Sieboldii* De Vriese ex Bailey (1901) proposed as new names for *P. cuspidatum* Sieb. & Zucc., not Willd., become synonyms of *P. cuspidatum* Sieb. & Zucc. As far as I can find, *P. Sieboldii* was never used as a valid name before being taken up by Bailey. In the citations given

¹Continued from Vol. 17: 53–82; for preceding parts see Vols. 10: 108–132, 164–196; 12: 275–281; 13: 299–332; 14: 223–252; 15: 1–27, 89–117, 267–326; 16: 311–340.

²See Jour. Arnold Arb. 10: 184.

by Meisner in DC. Prodr. 14: 136 under *P. Sieboldii* that name appears only as a synonym of *P. cuspidatum*.

Polygonum urophyllum Franchet & Bureau. — Rehder in Jour. Arnold Arb. 10: 184 (1929). — Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 186 (1929). — Steward in Contrib. Gray Herb. 88: 116 (1930).

Fagopyrum Mairei (Lévl.) H. Gross in Bull. Géog. Bot. 23: 25 (1913).

Polygonum Mairei Lévl. is cited as a synonym of *P. urophyllum* by Samuelsson and by Steward.

Polygonum Statice Lévillé in Fedde, Rep. Spec. Nov. 7: 338 (1909); in Bull. Soc. Bot. France, 57: 446 (1910); Fl. Kouy-Tchéou, 321 (1915). — Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 186 (1929). — Steward in Contrib. Gray Herb. 88: 115 (1930).

Fagopyrum Statice (Lévl.) H. Gross in Bull. Géog. Bot. 23: 26 (1913).

Polygonum multiflorum Thunberg sensu Rehder in Jour. Arnold Arb. 10: 185 (1929), quoad syn. *P. Statice* Lévl.; non Thunberg.

CHINA. K w e i c h o u : without precise locality, J. Esquirol, no. 164 (holotype; ex Lévillé).

I had placed *P. Statice* Lévl. on the authority of Dr. Samuelsson (in litt.) under *P. multiflorum* Thbg., but apparently on closer study, he found that it represents a distinct species related to *P. urophyllum* Franch. & Bur. I have not seen the type specimen.

RANUNCULACEAE¹

Clematis ranunculoides Franch. var. **tomentosa** Finet & Gagnepain in Bull. Soc. Bot. France, 50: 544 (1903); Contrib. Fl. As. Or. 1: 29 (1905).

Clematis urophylla Franch. var. *heterophylla* Lévillé in Bull. Acad. Intern. Géog. Bot. 17, no. 210–211, p. ii (1907). — **Synon. nov.**

Clematis urophylla Franch. sensu Lévillé, Fl. Kouy-Tchéou, 334 (1915) pro parte, quoad specim. Esquirol 763; vix Franchet.

? *Clematis Mairei* Lévillé in Fedde, Rep. Spec. Nov. 7: 337 (1909); Cat. Pl. Yun-Nan, 222 (1917).

CHINA. K w e i c h o u : without locality, J. Esquirol, no. 763 (holotype of *C. urophylla* var. *heterophylla*; photo. in A. A.). Y u n - n a n : Tong-chan, taillis et fourrets de la montagne, E. E. Maire, no. 381, June 19, 1905 (holotype of *C. Mairei*; ex Lévillé).

This variety looks quite distinct from typical *C. ranunculoides*, but seems to be connected by intermediate forms, such as Henry no. 9326

¹See Jour. Arnold Arb. 10: 185.

from Mengtze, 4600 ft. "red fls., erect plant," while another specimen under the same number with the note "low hills" agrees well with the var. *tomentosa*. The color of the flowers varies from white to rose-colored. The type of *C. Mairei* cannot be located in the Herb. Lévillé, but according to the description, it probably belongs here.

Clematis trullifera Finet & Gagnepain in Bull. Soc. Bot. France, **50**: 547 (1903); Contrib. Fl. As. Or. **1**: 32 (1905). — Lévillé, Cat. Pl. Yun-Nan, 222 (1917). — Handel-Mazzetti, Symb. Sin. **7**: 319 (1929).

Clematis coriigera Lévillé in Fedde, Rep. Spec. Nov. **12**: 281 (1913). — **Synon. nov.**

CHINA. Y u n n a n : haies, plaine de Tong-tchouan, alt. 2500 m., *E. E. Maire*, Sept. 1912, "Clematis grimpant à long rameaux, fleurs jaunes" (holotype of *C. coriigera*; photo. in A. A.).

Handel-Mazzetti cites (l.c.) a Maire specimen from the same locality, spelled by him "Dungtschwan" which is probably an isotype, but he does not mention Lévillé's name. *Clematis coriigera* is not enumerated by Lévillé in his Cat. Pl. Yun-Nan, neither as a valid species nor as a synonym of *C. trullifera*.

Clematis grata Wall. var. **argentilucida** (Lévl. & Vant.), comb. nov.

Clematis Vitalba L. var. *argentilucida* Lévillé & Vaniot in Bull. Acad. Intern. Géog. Bot. **11**: 167 (1902).

Clematis Vitalba γ *Cl. grata* (Wall.) Finet & Gagnepain in Bull. Soc. Bot. France, **50**: 532 (1903); Contrib. Fl. As. Or. **1**: 17 (1905), p.p., tandem quoad specim. cit. "Bodinier no. 1621."

Clematis grata var. *grandidentata* Rehder & Wilson in Sargent, Pl. Wilson. **1**: 338 (1913). — **Synon. nov.**

CHINA. K w e i c h o u : environs de Kouy-yang, commun dans les haies de la plaine, *E. Bodinier*, no. 1621, June 10, 1897 "fleurs blanches"; Collège, *E. Bodinier*, July 3, 1900 (syntypes of *C. Vitalba* var. *argentilucida*; photos. in A. A.).

The fact that Lévillé and Vaniot's varietal epithet antedates *C. grata* var. *grandidentata* makes a new combination necessary.

Clematis Gouriana Roxburgh ex De Candolle, Syst. **1**: 138 (1818). — Rehder in Jour. Arnold Arb. **10**: 188 (1929).

Clematis substipulata Kuntze in Verh. Bot. Ver. Brandenb. **26**: 100 (Monog. Clem.) (1885).

Clematis Vitalba L. var. *micrantha* Lévillé & Vaniot in Bull. Acad. Intern. Géog. Bot. **11**: 167 (1902). — Lévillé, Cat. Pl. Yun-Nan, 222 (1917).

Clematis Vitalba L. var. β *Cl. Gouriana* f. *substipulata* (Ktze.) Finet

& Gagnepain in Bull. Soc. Bot. France, 50: 532 (1903); Contrib. Fl. As. Or. 1: 17 (1905).

Clematis Martini Léveillé in Bull. Acad. Intern. Géog. Bot. 27, no. 210-211, p. ii (1907); Fl. Kouy-Tchéou, 333 (1915).

CHINA. K w e i c h o u : environs de Gan-pin, haies de la montagne, *L. Martin* in herb. Bodinier, no. 1884, Sept. 4, 1897, "fleurs blanches" (holotype of *C. Vitalba* var. *micrantha*; photo. in A. A.); Gan-chouen, *J. Cavalerie*, no. 3831, in 1910, "fleur blanche" (cited in Fl. Kouy-Tchéou under *C. Vitalba* var. *Gouriana*; photo. and merotype in A. A.); route de Pien-yang à Lo-fou, *J. Cavalerie*, no. 2662, Nov. 1905 (syntype of *C. Martini*; photo. in A. A.); bord du fleuve Hoa-kiang, *J. Esquirol*, no. 576, Aug. 5, 1905 (syntype of *C. Martini*; merotype in A. A.); Lo-fou, *J. Cavalerie*, no. 3583, March 1909 (sub *C. Martini* in Fl. Kouy-Tchéou; duplicate in A. A.).

It does not seem advisable to maintain *f. substipulata* as a distinct form or variety, since the stipules or bracts constitute a rather unstable character and may be present or absent on different inflorescences of the same specimen. Kuntze used the character of perulate and eperulate inflorescences for major divisions of the genus which led him to separate those forms of *C. Gouriana* with scales or leafy bracts (stipules) at the base of the inflorescence as a distinct species. The species was reduced by Finet and Gagnepain to a form of their *C. Vitalba* β *Cl. Gouriana*, and they cite under it Bodinier's no. 1884 which is the holotype of *C. Vitalba* var. *micrantha* Lévl. & Vant., but the specimen in the Léveillé herbarium which is rather fragmentary, shows no stipules. Leafy bracts, however, are present in Cavalerie no. 3583, referred to *C. Martini* by Léveillé (Fl. Kouy-Tchéou, 333).

Specimens of *C. Gouriana* with leafy bracts or scales at the base of the inflorescence are found occasionally, as Henry no. 4329 and Wilson no. 2397 (Veitch Exp.) from Hupeh, and Hers, nos. 848 and 1351 from Honan. Also in *C. Gouriana* var. *Finetii* Rehd. & Wils., some specimens exhibit this character, as Wilson no. 672 (type of var. *Finetii*) from Hupeh, and J. F. Rock no. 14733 from Kansu. From the specimens cited, it appears that this variation occurs in the northern part of the range of the species.

Cavalerie no. 2662 is a syntype of *C. Martini*, but there is another specimen under the same number in Herb. Léveillé, which is *C. rubifolia* Wright and was correctly referred by Léveillé to that species (Fl. Kouy-Tchéou, 333).

Clematis parviloba Gardn. & Champ. var. *ganpiniana* (Lévl. & Vant.), comb. nov.

Clematis Vitalba var. *Ganpiniana* Léveillé & Vaniot in Bull. Acad. Intern. Géog. Bot. 11: 167 (1902).

Clematis parviloba Gardn. & Champ. var. *glabrescens* Finet & Gagnepain in Bull. Soc. Bot. France, 50: 534 (1903); Contrib. Fl. As. Or. 1: 19 (1905). — Léveillé, Fl. Kouy-Tchéou, 333 (1915); Cat. Pl. Yun-Nan, 222 (1917).

CHINA. K w e i c h o u : environs de Gan-pin, *L. Martin* in herb. *Bodmier*, nos. 1788, 1882 and 1883, August 10, August 4, and Sept. 4, 1897 "fleurs blanches" (syntypes of *C. Vitalba* var. *Ganpiniana*; photo. of no. 1883 in A. A.).

Clematis Vitalba var. *Ganpiniana* was first cited by Finet & Gagnepain (l.c.) as a synonym of their new variety *C. parviloba* var. *glabrescens*, without employing the earlier varietal epithet.

LARDIZABALACEAE¹

Stauntonia Cavalerieana Gagnepain in Bull. Soc. Bot. France, 55: 47 (1908). — Léveillé, Fl. Kouy-Tchéou, 50 (1914).

Epimedium Cavaleriei Léveillé, Cat. Pl. Yun-Nan, 18, in nota (1915); China Rev. Ann. 1916: 18 (MS.).

CHINA. K w e i c h o u : Pin-fa, près cascade, *J. Cavalerie*, no. 1266, March 1903 (holotype of *Stauntonia Cavalerieana* in herb. Paris, ex Gagnepain; and holotype of *Epimedium Cavaleriei*; photo. in A. A.).

Stauntonia Cavalerieana and *Epimedium Cavaleriei* are both based on Cavalerie 1266, cited by Léveillé in his Fl. Kouy-Tchéou under the first name and in his Cat. Pl. Yun-Nan under the second name, but neither name appears on the type specimen in herb. Léveillé in Léveillé's handwriting. A fruiting specimen collected in Kweichou by Steward, Chiao and Cheo (no. 856) may belong here.

Stauntonia obovata Hemsley in Hooker's Ic. Pl. 29: t. 2847 (1907).

Akebia Cavaleriei Léveillé, Fl. Kouy-Tchéou, 47 (1914). — **Synon. nov.**

Holboellia spec. Rehder in Jour. Arnold Arb. 10: 189 (1929).

CHINA. K w e i c h o u : Pin-fa, contreforts de Yuin-ou-chan, *J. Cavalerie*, no. 955, March 28, 1903, "fleurs blanches" (holotype of *Akebia Cavaleriei*; photo. in A. A.).

When I referred in 1929 (l.c.) *Akebia Cavaleriei* Lévl. to *Holboellia*, I had only a photograph of the type with fragments consisting of detached leaflets before me, but now the loan of the type specimen enabled me to examine a flower which shows that it belongs to *Stauntonia*. *Stauntonia obovata* has so far been recorded only from Hongkong.

¹See Vol. 10: 189.

Holboellia coriacea Diels. — Rehder in Jour. Arnold Arb. 10: 189 (1929).

Artabotrys Esquirolii Léveillé, Fl. Kouy-Tchéou, 29 (1914), p.p., quoad specim. Esquirol, no. 2184.

CHINA. K w e i c h o u : Gny-hien, bord du ruisseau, 700 m., *J. Esquirol*, no. 2184, June 1910 (syntype of *Artabotrys Esquirolii*; merotype in A. A.).

In my note under this species (l.c.) I stated that the description does not seem to fit Esquirol's no. 2184, and that I had not seen the other syntype. I have now before me Esquirol's no. 2033, the other syntype, which agrees better with the description; this is not an *Artabotrys*, however, but belongs to *Desmos cochinchinensis* Lour. (see p. 324).

Holboellia latifolia Wallich, Tent. Fl. Napal. 24, t. 16 (1824).

Hoya Cavaleriei Léveillé, Fl. Kouy-Tchéou, 42 (1914). **Synon. nov.**

CHINA. K w e i c h o u : Kan-pey, *J. Esquirol*, no. 322, no date, "fleurs rouges ou roses" (holotype of *Hoya Cavaleriei*; photo. in A. A.).

Esquirol's no. 322 which has 3-foliolate leaves is apparently referable to typical *H. latifolia* which has 3–5 leaflets.

BERBERIDACEAE¹

Berberis Cavaleriei Léveillé in Fedde, Rep. Spec. Nov. 9: 454 (1911). — Schneider in Oester. Bot. Zeitschr. 67: 140 (1918). — Byhouwer in Jour. Arnold Arb. 9: 133 (1928).

Berberis Griffithiana Schneider sensu Schneider in Sargent, Pl. Wilson. 1: 364 (1913), pro parte, quoad specim. citata. — Léveillé, Fl. Kouy-Tchéou, 48 (1914). — Rehder in Jour. Arnold Arb. 10: 189 (1929). — Handel-Mazzetti, Symb. Sin. 7: 326 (1929). — Non Schneider (1905).

CHINA. K w e i c h o u : entre Kouan-chan et Kouy-yang, *J. Cavalerie*, no. 3209, Apr. 1907, "fleurs jaunes" (holotype of *B. Cavaleriei*; photo. in A. A.).

Schneider in 1913 (l.c.) referred to his *B. Griffithiana* based in 1905 on Griffith 125 from Bhutan, several Chinese specimens, and he also identified *B. Cavaleriei*, of which Léveillé had sent fragments to the Arnold Arboretum in 1916, as *B. Griffithiana*; this induced Léveillé to cite his *B. Cavaleriei* in his Fl. Kouy-Tchéou as a synonym of *B. Griffithiana* and transfer the name to another species which turned out to be a *Gymnosporia* (see Jour. Arnold Arb. 14: 250). In 1917, however, Schneider (in Sargent, Pl. Wilson. 3: 438) stated that *B. Griffithiana* is entirely absent from China, and therefore, took up again in 1918 (l.c.) the name *B. Cavaleriei* Lévl. of 1911.

¹See Vol. 10: 189.

Berberis Julianae Schneider in Sargent, Pl. Wilson. 1: 360 (1913); in Oester. Bot. Zeitschr. 67: 138 (1918). — Lévillé, China, Rev. Ann. 1916, p. 18 (MS).

Berberis stenophylla "Hance" sensu Lévillé, Fl. Kouy-Tchéou, 48 (1914); non Hance, nec Lindl.

Berberis Griffithiana Schneider sensu Schneider in Sargent, Pl. Wilson. 1: 364 (1913), p.p., quoad specim. Bodinier 2143 [= 2145]; non Schneider (1905).

CHINA. K w e i c h o u : environs de Kouy-yang, commun partout dans la mont., *E. Bodinier*, no. 2145, March 30, 1898 "fleur jaune foncé" (photo. in A. A.).

Berberis stenophylla Lévl. was referred by Lévillé in 1916 (l.c.) and by Schneider in 1918 (l.c.) to *B. Julianae*, but it differs from typical *B. Julianae* in the smaller leaves with only 3–7 pairs of teeth.

Berberis bicolor Lévillé in Fedde, Rep. Spec. Nov. 9: 454 (1911); Fl. Kouy-Tchéou, 48 (1914). — Schneider in Oester. Bot. Zeitschr. 67: 144 (1918).

Berberis acuminata "Franchet" sensu Schneider in Bull. Herb. Boiss. ser. 2, 8: 197 (1908), p.p., quoad specim. Henry 13267; non Franchet.

Berberis subacuminata Schneider in Sargent, Pl. Wilson. 1: 363 (1913). — Lévillé, Cat. Pl. Yun-Nan, 18 (1915).

CHINA. K w e i c h o u : Ma-jo, *J. Cavalerie*, no. 3043, May, 1908, "fleurs extérieurement rouges, intérieurement blanches" (holotype of *B. bicolor*; merotype in A. A.).

Mahonia elegans (Lévl.), comb. nov.

Berberis (*Mahonia*) *elegans* Lévillé in Bull. Soc. Bot. France, 51: 289 (1904).

Mahonia Bodinieri Gagnepain in Bull. Soc. Bot. France, 55: 86 (1908). — Schneider in Sargent, Pl. Wilson. 1: 384 (1913). — Lévillé, Fl. Kouy-Tchéou 49 (1914); Cat. Pl. Yun-Nan, 19 (1915).

Mahonia Leveilleana Schneider in Sargent, Pl. Wilson. 1: 385 (1913). — Lévillé, Fl. Kouy-Tchéou, 49 (1914).

Mahonia elegans Lévillé, Fl. Kouy-Tchéou, 49 (1914), pro synonym. *M. Leveilleanae*.

CHINA. K w e i c h o u : environs de Gan-pin, *L. Martin* in herb. *Bodinier*, no. 2465, July 27, 1897 (syntype of *Berberis elegans*; photo. in A. A.); environs de Kouy-yang, mont du Collège, *E. Bodinier*, no. 2465 [not 2469] July 7, 1898 (syntype of *B. elegans* in herb. Lévl. and holotype of *M. Leveilleana* in herb. Mus. Vindob.; photo. in A. A.); environs de Gan-pin et Kouy-yang, *L. Martin* in herb. *Bodinier*, no. 2465, July 19, 1898 holotype of *M. Bodinieri* in herb. Paris; fragments in A. A.); environs de Tou-chan, Lao-chou-tse, *J. Cavalerie* in herb. *Bodinier*, July 19, 1897 (syntype of *B. elegans*; photo. in A. A.).

In his Flore du Kouy-Tchéou, Lévillé cites Bodinier no. 2465 under *Mahonia Bodinieri*, and Cavalerie's specimen from Tou-chan under *M. Leveilleana*. Later when at the Arnold Arboretum in 1916-19 Schneider himself referred his *M. Leveilleana* to *M. Bodinieri*. He was apparently not aware that *Berberis elegans* had been validly published and considered it a manuscript name, which he did not care to use to avoid any possible confusion with his *Berberis elegans* published in 1905; Lévillé's name published a year earlier, however, invalidates *B. elegans* Schneid. which has to receive a new name.¹ The specimen from Tou-chan differs slightly from the other two syntypes but is evidently conspecific.

Takeda in 1917 in his paper on *Mahonia* (in Notes Bot. Gard. Edinb. 6: 238) lists *M. Bodinieri*, *M. Leveilleana* and *M. ganpinensis* (Lévl.) Fedde among the species he has not seen.

MENISPERMACEAE

Cocculus laurifolius DeCandolle, Prodr. 1: 100 (1824).

Cinnamomum Esquirolii Lévillé Fl. Kouy-Tchéou, 218 (1915). —
Synon. nov.

CHINA. K w e i c h o u : bois de Ta-ram, rivière de Lo-hou, J. Esquirol, no. 3586, March 1912, "fleurs jaunes" (syntype of *Cinnamomum Esquirolii*; merotype in A. A.); chemin de Pell-tiang, J. Esquirol, 3757, June 1912 (syntype of *C. Esquirolii*; ex Lévillé).

The locality cited above marks the northwestern limit of the range of this widely distributed species. There are also specimens from Kwangtung (C. L. Tso, Sun Yatsen herb. 20860) and from Fukien (H. H. Chung 7774) in this herbarium.

MAGNOLIACEAE²

Illicium Griffithii Hooker f. & Thomson, Fl. Ind. 1: 74 (1855). —
Hooker, Fl. Brit. Ind. 1: 40 (1875).

Glochidion Cavaleriei Lévillé in Fedde, Rep. Spec. Nov. 12: 183 (1913); Fl. Kouy-Tchéou, 163 (1914).

Illicium Cavaleriei (Lévl.) Lévillé in Monde Pl. ser. 2, 18: 31 (1916); Rev. Ann. Chine, 1916: 20, 23. — **Synon. nov.**

CHINA. K w e i c h o u : Pin-fa, ruisseau de La-tong, J. Cavalerie, no. 578, Oct. 1, 1902 (holotype of *Glochidion Cavaleriei*; photo. in A. A.).

¹ *Berberis Schneideri*, nom. nov.

Berberis sinensis var. *elegans* Franchet, Pl. Delavay, 35 (1889).

Berberis elegans (Franch.) Schneider in Bull. Herb. Boiss., ser. 2, 5: 463 (1905); non Lévillé (1904).

CHINA. Y u n n a n : near Mo-so-yn, Delavay, June 18, 1887, and nos. 827 and 1087.

²See Vol. 10: 190.

The specimen agrees well in the shape and size of the leaves and in the comparatively short beak of the mature carpels with *I. Griffithii*; the seed is 4.5 mm. long.

ANNONACEAE¹

Desmos cochinchinensis Loureiro, Fl. Cochinch. 352 (1790). — Merrill in Trans. Am. Phil. Soc. n. ser. 14, pt. 2: 160 (1935).

Artabotrys Esquirolii Lévêillé, Fl. Kouy-Tchéou, 29 (1914), p.p. excl. specim. 2184. — **Synon. nov.**

CHINA. K w e i c h o u : ruisseau Sen-tse-pa, alt. 1400 m., *Esquirol* no. 2033, April 17, 1910 (syntype of *Artabotrys Esquirolii*; photo. in A. A.).

When I referred in 1929 (in Jour. Arnold Arb. 10: 189) *Artabotrys Esquirolii* to *Holboellia coriacea* Diels, to which the other syntype, *Esquirol*, no. 2184 belongs, I had not seen *Esquirol* no. 2033 which I have now before me; it agrees with the description, except that "folia . . . ovata" and "flores . . . masculi atrorubri" seem to be based on *Esquirol* no. 2184.

LAURACEAE²

Determined by CAROLINE K. ALLEN

Cinnamonum Bodinieri Lévêillé in Fedde, Rep. Spec. Nov. 10: 369 (1912); Fl. Kouy-Tchéou, 218 (1914); Cat. Ill. Pl. Seu-Tchouen, 96, t. 45 (1918)MS; Rev. Ann. Chine, 1916: 21, MS.

Cinnamonum hupehanum Gamble in Sargent, Pl. Wilson. 2: 69 (1914). — Liou, Laurac. Chine & Indoch. 26 (1932).

CHINA. K w e i c h o u : environs de Kouy-yang, bois de la pagode de Lau-yo-chan, *E. Bodinier*, no. 2622, June 15, 1899 "arbre enorme en hauteur et grosseur" (holotype of *C. Bodinieri*; photo. in A. A.).

In his Flore du Kouy-Tchéou, and later in China Review, Lévêillé mentions *Cinnamonum hupehanum* as a synonym of *C. Bodinieri*. Liou who prepared his Lauraceae of China and Indochina at the Paris Herbarium referred without citing Lévêillé's name Bodinier no. 2622 in the Paris herbarium to *C. hupehanum*. This number is the type of *C. Bodinieri*.

Cinnamonum Camphora Nees & Ebermayer, Handb. Med. Pharm. Bot. 2: 430 (1831).

Cinnamonum Taquetii Lévêillé in Fedde, Rep. Spec. Nov. 10: 370 (1912). — **Synon. nov.**

KOREA. Q u e l p a e r t : in sylvis Tolsouni rara, *E. Taquet*, no.

¹See Vol. 10: 191.

²See Vol. 10: 192.

1344, Oct. 1908, (syntype of *C. Taquetii*; isotype in A. A.); in sylvis Taitpjeng rara, *E. Taquet*, no. 3159, July 1909 (syntype of *C. Taquetii*; isotype in A. A.).

Cinnamomum Parthenoxylon Meissner in De Candolle, Prodr. 15¹: 26 (1864). — Liou, Laurac. Chine & Indoch. 28 (1932).

Cinnamomum Neesianum Meissner l.c. — Léveillé Rev. Ann. Chine, 1916: 21. MS.

Cinnamomum Cavaleriei Léveillé in Fedde, Rep. Spec. Nov. 10: 370 (1912); Fl. Kouy-Tchéou, 218 (1914).

CHINA. K w e i c h o u : Pin-fa, *J. Cavalerie*, no. 1084, June 23, 1903 (holotype of *C. Cavaleriei*, photo. in A. A.); Ly-Po, *J. Cavalerie*, no. 2630, in 1899 (cited as *C. Neesianum* in Rev. Ann. Chine; photo. in A. A.).

The *Cinnamomum Parthenoxylon* of Meissner was distinguished by him from *C. Neesianum* by its odor, more conspicuous veins and veinlets and more divergent ribs. *Cinnamomum Neesianum* has long since been reduced to synonymy under *C. Parthenoxylon*, the conception of which has expanded to include these varying leaf characters. This is perhaps the best way to dispose of these species for there is not much difference, from the descriptions at least. The Cavalerie numbers cited above, agree with the description for *C. Neesianum*, but must be included under *C. Parthenoxylon*.

Cinnamomum pedunculatum Nees var. **angustifolium** Hemsley in Jour., Linn. Soc. Bot. 26: 373 (1891). — Léveillé, Cat. Ill. Pl. Seu-Tchouen, 97 (1918) MS. — Liou, Laurac. Chine & Indoch. 37 (1932).

Cinnamomum linearifolium Lecomte in Nouv. Arch. Mus. Paris, sér. 5, 5: 79 (1913). — Liou, Laurac. Chine & Indoch. 32 (1932). —

Synon. nov.

CHINA. K w e i c h o u : sud de Lo-fou, *J. Cavalerie*, no. 3082, April 1907 (holotype of *C. linearifolium*; isotype in herb. N. Y.; photo. in A. A.). S z e c h u a n : *E. Faber*, no. 575 (syntype of *C. pedunculatum* var. *angustifolium*; isotype in herb. N. Y.; (photo. in A. A.).

Lecomte when describing *Cinnamomum linearifolium* draws attention to the fact that it resembles *C. pedunculatum* var. *angustifolium*, but he points out the differences between the two, namely, the size and venation of the leaves, and the cross section of the petiole.

An examination of sheets of the two types discloses the differences mentioned by Lecomte, but these would seem to be differences of degree only, and not specific.

I have before me a photograph of *Laurus Heyneana* Wallich, mentioned in Wallich's Catalogue no. 2576, the locality unknown. This has

been transferred by Nees¹ to *Cinnamomum Heyneana*, and by Meissner² to *Cinnamomum iners* var. *subvenosum*. As far as can be judged by the photograph, the specimen is very similar to *Cinnamomum pedunculatum* var. *angustifolium*. An examination of the actual specimen would be necessary, however, before making the change in synonymy.

***Alseodaphne camphorata* (Lévl.) Allen, comb. nov.**

Machilus camphoratus Léveillé in Fedde, Rep. Spec. Nov. 9: 460 (1911).

Alseodaphne caudata Lecomte in Nouv. Arch. Mus. Paris, sér. 5, 5: 97 (1913). — Liou, Laurac. Chine & Indoch. 43 (1932). — **Synon.**

nov.

CHINA. Kweichow: Pin-fa, *J. Cavalerie*, no. 1002, May 1903, "petit arbre, odeur de camphre" (holotype of *Machilus camphoratus* and of *Alseodaphne caudata*; photo. in A. A.).

Léveillé in 1911 described *Machilus camphoratus* based on Cavalerie no. 1002. This apparently passed unnoticed, for three years later, Lecomte from the same number described *Alseodaphne caudata*. Examination of Léveillé's specimen shows it to be identical with *Alseodaphne caudata* Lecomte.

***Machilus Cavaleriei* Léveillé.** — Rehder in Jour. Arnold Arb. 10: 192 (1929). — Liou, Laurac. Chine & Indoch. 60 (1932).

This species is very different from any known *Machilus*. The leaves are dull, very prominently reticulate, and obtuse to emarginate at the tip. The inflorescence is large and open. At first glance it resembles *Beilschmiedia*, but the floral structure is typical *Machilus*. The perianth lobes are very rough gray pubescent on the outside.

***Machilus longipedicellata* Lecomte** in Nouv. Arch. Mus. Paris, sér. 5, 5: 101 (1913). — Handel-Mazzetti, Symb. Sin. 7: 253 (1931). — Liou, Laurac. Chine & Indoch. 51 (1932).

To this species belongs *J. Cavalerie*, no. 3007, Kweichow: Majo, April 20, 1908, "fl. vert-jaune," cited by Léveillé in his *Fl. Kouy-Tchéou*, 221 (1914) under *M. oreophila* Hance. I have before me a photograph of the type of *M. oreophila* Hance. Cavalerie's specimen differs from this radically in leaf-shape, and somewhat in the inflorescence. The nearest species seems to be *M. longipedicellata* or one very close to it.

***Machilus Rehderi* Allen, spec. nov.**

Arbor parva; ramuli glabri, purpureo-nigri, rugosi. Folia in superiore

¹Nees in Wallich, Pl. As. Rar. 2: 76 (1831).

²Meissner in De Candolle, Prodr. 15¹: 20 (1864).

parte ramulorum approximata, coriacea, lanceolata, longe acuminata acumine obtuso, basin versus attenuata, 9–12 cm. longa et 1.5–3 cm. lata, glabra, nitida, supra flavo-viridia, subtus pallidiora, costa leviter impressa, nervis utrinsecus 7–8 inconspicuis angulo 45° divergentibus, minute reticulata; petioli glabri, 1.5–2 cm. longi. Inflorescentiae paniculatae vel racemosae, 10–11 cm. longae, glabrae, in basi innovationum bracteis deciduis pallide rubro-fuscis tomentosis suffultae; pedunculi 3–5 cm. longi, graciles; pedicelli 7–13 mm. longi, glabri; flores 8–9 mm. longae; perianthium fere ad basin divisum, lobis 6, 6–7 mm. longis extus glabris demum reflexis, exterioribus lanceolatis obtusis intus glabris 2 mm. latis, interioribus intus dense pubescentibus, quam exteriora paulo brevioribus; stamina 9, circa 5 mm. longa, aequalia vel subaequalia, filamentis glabris 3.5 mm. longis, antheris introrsis oblongis 1.5 mm. longis, ea ordinis III. leviter ad basin pilosa et glandulis 2 reniformibus stipitatis 1.5–2 mm. longis instructis; staminodia ordinis IV. triangularia, auriculata, acuta, stipitata; ovarium subglobosum; stylus filamentis paulo brevior. Drupa globosa, minute apiculata, 7–8 mm. diam., glabra, basi perianthio reflexo instructa, pedicello incrassato.

CHINA. K w e i c h o u : bois, Pin-fa, *J. Cavalerie*, no. 1741, April 5, 1904 “fl. voyantes à odeur forte, petit arbre” (type, photo. in A. A.); Pin-fa, *J. Cavalerie*, no. 2345, June 8, 1905, “petit arbre.”

These two specimens are in the Léveillé herbarium as *Machilus Thunbergii* S. & Z. They are distinguished from this species by the leaf shape, inflorescence and the more evident thickening of the inflorescence in fruit. This species I am naming for Prof. A. Rehder who is completing a revision of the specimens in the Léveillé Herbarium.

Machilus Thunbergii Siebold & Zuccarini in Abh. Akad. Münch. 4: 202 (1846).

Litsea coreana Léveillé in Fedde, Rep. Spec. Nov. 10: 370 (1912). — **Synon. nov.**

KOREA. Q u e l p a e r t : in pago Syekeni prope mare *E. Taquet*, no. 1356, July 1908 (syntype of *Litsea coreana*; isotype in A. A.); in silvis Taitpjeng, Yangkeuni et Sampangsan, Jul.–Oct. 1908–1910, *E. Taquet* nos. 1355, 3171, 4401 (syntypes of *L. coreana*; fragments in A. A.).

Nothaphoebe omeiensis Chun in Contrib. Biol. Lab. Sci. Soc. China, 15: 33 (1925); Jour. Arnold Arb. 8: 21 (1927). — Rehder in Jour. Arnold Arb. 10: 192 (1929). — Liou, Laurac. Chine & Indoch. 79 (1932).

Liou mentions as synonyms the same Léveillé species as cited by Rehder (l.c.).

Phoebe neurantha (Hemsl.) Gamble in Sargent, Pl. Wilson. 2: 72 (1914). — Liou, Laurac. Chine & Indoch. 69 (1932).

Machilus neurantha Hemsley in Jour. Linn. Soc. Bot. 26: 376 (1891).

In the Catalogue illustré et alphabétique des plantes du Seu-Tchouen, Lévillé mentions *M. neurantha* var. *ferruginea*, without citing a collector or number. The sheet, so far, has not been found in the Lévillé herbarium. It has probably been placed in another species or even in another genus.

Sassafras tzumu Hemsley in Kew Bull. Misc. Inform. 1907: 55. — Rehder in Jour. Arnold Arb. 1: 244 (1920).

Pseudosassafras tzumu Lecomte in Not. Syst. 2: 269 (1912). — Liou, Laurac. Chine & Indoch. 81 (1932). — Merrill, Comment. Loureiro Fl. Cochinch. 165 (1935).

Lindera camphorata Lévillé in Fedde, Rep. Spec. Nov. 9: 459 (1911); Fl. Kouy-Tchéou, 219 (1914). — **Synon. nov.**

CHINA. K w e i c h o u : Touan-po, district de Oui-ne, *J. Cavalerie* no. 2484, Aug. 13, 1905 "arbre rare" (holotype of *Lindera camphorata*; photo. in A. A.).

Neolitsea undulatifolia (Lévl.) Allen, comb. nov.

Litsea undulatifolia Lévillé, Fl. Kouy-Tchéou, 220 (1914).

Neolitsea spec. Rehder in Jour. Arnold Arb. 10: 193 (1929).

Frutex glaber; rami et ramuli teretes, laeves, tenuiter striati, ramuli ultimi olivacei, rami vetustiores partim decorticantes cortice interiore rubro-brunneo. Folia in apice ramulorum congesta, subverticillata, lanceolata, 5–7 cm. longa et 1–2 cm. lata, margine undulata, apice longe acuta, basi cuneata, supra opace coeruleo-viridia, subtus pallide brunnea, costa utrinque prominente elevata, penninervia, nervis inconspicuis utrinsecus 12–15 angulo 60° divergentibus; petioli breves ad 2.5 cm. longi. Inflorescentiae umbellatae, sessiles, 6–9 mm. longae, infra foliorum verticillum ultimum spiraliter dispositae, pluribus bracteis glabris inclusae; flores numerosi, pedunculis pubescentibus circa 4 mm. longis; perianthium fere ad basin divisum, lobis 4 glabris, 2 interioribus anguste ovatis plus minusve carinatis 4 mm. longis, exterioribus late ovatis majoribus; stamina 6, 2–4 filamentis glabris satis robustis circa 2 mm. longis, basi glandulis sessilibus reniformibus instructis, stamina reliqua filamentis eglandulosis 2.5 mm. longis gracillimis, antheris oblongis introrsis 1.5 mm. longis; ovarium ellipsoideum, glabrum.

CHINA. K w e i c h o u : Tou-chan, *J. Cavalerie*, without number, March 14, 1900 "arbuste, fl. blanches, odoriferantes," (holotype of *Litsea undulatifolia*, dupl. in A. A.).

This species resembles superficially *Neolitsea confertifolia* (Hemsl.)

Merr., but can be distinguished vegetatively from it by the narrower leaves not glaucescent beneath and undulate at the margin.

As Lévillé's description is inadequate, a complete description has been given above. Lévillé states that both the leaves and the inflorescence are fasciculate.

Litsea Dunniana Lévillé in Fedde, Rep. Spec. Nov. 9: 460 (1911); Fl. Kouy-Tchéou, 220 (1914).

Neolitsea spec. Rehder in Jour. Arnold Arb. 10: 193 (1929).

CHINA. K w e i c h o u : forêts de Gam-go, *J. Esquirol*, no. 565, Dec. 15, 1905, "arbre" (type of *L. Dunniana*, photo. in A. A.).

This species has been left in *Litsea* because of the number of stamens and the type of inflorescence.

The type of *Litsea Dunniana* superficially resembles *Litsea Garrettii* Gamble var. *longistaminata* Liou.¹ The pubescence on the undersurface of the leaf of Esquirol no. 565, however, consists of long, slightly villous hairs, the inflorescence is sessile, the staminal filaments are glabrous, and the style is covered with whitish hairs. In the two syntypes of *Litsea Garrettii* var. *longistaminata*, the isotypes of which I have before me, the pubescence on the undersurface of the leaf consists of shorter, less conspicuous hairs; the inflorescence consists of umbels in a short raceme; the staminal filaments are covered with brownish hairs, and the style is glabrous.

Litsea Esquirolii (Lévl. in herb.) Allen, spec. nov.

Eurya Esquirolii Lévillé, Fl. Kouy-Tchéou 415 (1915), nomen nudum.

Neolitsea spec., Rehder in Jour. Arnold Arb. 10: 193 (1929).

Arbor?; rami brunnei, pubescentes, ultimi ramuli dense pubescentes, vetustiores glabri. Folia in parte superiore ramulorum, lanceolato-elliptica, 6–10 cm. longa et 1.75–2.5 cm. lata, apice acuminata, ad basin sensim attenuata, supra nitida, subtus pallidiora, glaucescentia, minute pubescentia, penninervia, costa subtus pilosa manifeste elevata quam parenchyma intensius colorata, nervis utrinsecus 5–8 utrinque leviter elevatis, supra rete venularum satis distincto; petioli dense sed tenuiter pubescentes, 8–13 mm. longi. Umbellae 1–3 in axillis foliorum et saepe infra in axillis bractearum caducarum, pedunculis 2 mm. longis pubescentibus; flores plures, sessiles, circa 5 mm. longi, bracteis 4 inclusi, exterioribus brunneis leviter pubescentibus, interioribus majoribus pallide brunneis dense pubescentibus; perianthium ad 2/3 divisum, tubo inferiore parte extus densissime longe piloso, intus dense breviter pubescente, lobis 6 oblongo-lanceolatis acutis extus sparsius pubescenti-

¹Liou, Laurac. Chine & Indoch. 196 (1932).

bus intus glabris; stamina 7-9, antheris extrorsis, 2-3 interiora filamentis 3 mm. longis sparse pilosis ad basin glandulis 2 sessilibus cordatis instructis, stamina reliqua filamentis eglandulosis paulo longioribus gracilioribus; pistillum circa 2 mm. longum ovario ovoideo, stylo curvato, stigmatе conspicuo.

CHINA. K w e i c h o u : Gan chouen, *J. Esquirol*, no. 3893, 1912 (type = isotype of *Eurya Esquirolii*, nom. nud., in A. A.).

Superficially this species resembles somewhat *Litsea lancifolia* Hook. f., but the leaves of the latter are of finer texture, longer and not shining; the inflorescence consists of groups of stalked small umbels, while in *Litsea Esquirolii*, there is a single cluster of umbels to a peduncle.

There is a question of the technicality of making *Litsea Esquirolii* a new species. Lévillé in *Flore du Kouy-Tchéou*, has mentioned the name only. Since the first description to appear is the one given above, it has been published as a new species.

Litsea mollis Hemsley in *Jour. Linn. Soc. Bot.* 26: 383 (1891). — Lévillé, *Fl. Kouy-Tchéou*, 220 (1914). — Liou, *Laurac. Chine & Indoch.* 186 (1932).

CHINA. K w e i c h o u : Touan-po, Mou-kiang-to, *J. Cavalerie*, no. 2486, August 13, 1905; "grand arbre 7 ou 8 mètres, arbre purpurié, le fruit vert de condiment" (cited in *Fl. Kouy-Tchéou* under *L. mollis*).

Cavalerie no. 2486, which I have before me, has been correctly identified by Lévillé. Liou recognizes *L. mollis*, but appends a note to the effect that in his opinion, *L. mollis* will eventually, when fruit is known, go into synonymy under *L. cubeba* Pers.

***Litsea* spec.**

Lindera Esquirolii Lévillé in *Fedde, Rep. Spec. Nov.* 9: 327 (1911); *Fl. Kouy-Tchéou* 219 (1914), as synonym of *Lindera praecox* Blume.

CHINA. K w e i c h o u : *J. Esquirol*, no. 738 (type of *Lindera Esquirolii*; photo. in A. A.).

Lévillé described *Esquirol* no. 738 as a new species in *Fedde's Repertorium*. Later, in his *Flore du Kouy-Tchéou*, he placed it under *Lindera praecox* Bl., along with *Bodinier* no. 2114, *Esquirol* nos. 369 and 911. Close examination of all four numbers, however, reveals the fact that they do not belong to the genus *Lindera* but to *Litsea* and are very close to *L. sericea* Hook. f. They doubtless represent a new species, but without leaf specimens and fruit, its description would be inadequate.

Benzoin commune (Hemsl.) Rehder, *Jour. Arnold Arb.* 1: 144

(1919); l.c. 10: 194 (1929). — Handel-Mazzetti, *Symb. Sin.* 7: 258 (1931).

Lindera communis Hemsley in Jour. Linn. Soc. Bot. 26: 387 (1891). — Liou, Laurac. Chine & Indoch. 130 (1932).

Lindera Bodinieri Léveillé in Fedde, Rep. Spec. Nov. 10: 371 (1912).

CHINA. K w e i c h o u : Add: Pin-fa, *J. Cavalerie*, no. 798, June 25, 1902 (syntype of *L. Bodinieri*; photo. in A. A.).

There is a great variation in the amount of pubescence in this species. The only two numbers I have seen of those quoted by Hemsley as syntypes of *Lindera communis*, Henry 1296 and 3413, are sparingly and very finely pubescent on the lower leaf surface and twigs. The majority of the specimens examined from Hupeh are similar to these or more pubescent. For the most part, those collected in Yunnan have much the same characteristics. In some cases, however, the pubescence is confined only to the primary veins of the leaf. Bodinier no. 105, type of *Lindera yunnanensis* Lévl. and referred to *B. commune* by Rehder, is typical of the species. Esquirol no. 372 (type of *Litsea Esquirolii* Lévl.) and Bodinier no. 2179 (type of *Lindera Bodinieri*) placed under *B. commune* by Rehder, are both very densely pubescent.

Those numbers from the eastern provinces of China represent the other extreme, in being almost entirely glabrous on the under surface of the leaves and the twigs.

Benzoin glaucum Siebold & Zuccarini. — Rehder in Jour. Arnold Arb. 10: 194 (1929).

Lindera glauca Blume, Mus. Bot. Lugd.-Bat. 1: 325 (1850). — Léveillé, Fl. Kouy-Tchéou, 219 (1914).

CHINA. K w e i c h o u : Pin-fa, *J. Cavalerie*, no. 45, July 15, 1902; without definite locality, *J. Cavalerie*, no. 2378, "fl. verte jaune," March 26, "fr." June 15, 1905.

Cavalerie nos. 45 and 2378 which Léveillé cites are typical *B. glaucum*, but no. 1961 is an *Ilex*, apparently referable to *I. cinerea* Champ.

Benzoin touyunense (Lévl.) Rehder in Jour. Arnold Arb. 10: 194 (1929); 11: 158 (1930). — Handel-Mazzetti, *Symb. Sin.* 7: 258 (1931).

Litsea touyunensis Léveillé in Fedde, Rep. Spec. Nov. 11: 63 (1912); Fl. Kouy-Tchéou, 220 (1914).

Benzoin touyunense f. **megaphyllum** (Hemsl.) Rehder in Jour. Arnold Arb. 11: 158 (1930).

Lindera megaphylla Hemsley in Jour. Linn. Soc. Bot. 26: 389 (1891). — Léveillé, Fl. Kouy-Tchéou, 219 (1914), pro parte. — Liou, Laurac. Chine & Indoch. 124 (1932).

CHINA. K w e i c h o u : Add: Majo, Long-by, *J. Cavalerie*, no. 3053 (in part), July 1908, "assez grand arbre" (cited under *Lindera megaphylla* Brandis).

Léveillé has placed under *Lindera megaphylla* Brandis, *Cavalerie* no. 3053, which consists of two sheets at least. Of the two sheets which I have seen, one is *Benzoin touyunense* f. *megaphylla* (Hemsl.) Rehd., and the other is *Actinodaphne reticulata* Meissn. *Cavalerie*, no. 3585, cited along with no. 3053 is *Tarennà incerta* Koord. & Val. (see *Jour. Arnold Arb.* 16: 321).

The author citation "Brandis" for *Lindera megaphylla* is apparently a mistake. In any case, it is Hemsley's species that Léveillé had in mind, which is a synonym of *Benzoin touyunense* f. *megaphylla*. The leaves are glabrous on the lower surface, which is the character separating the form from the species proper.

CAPPARIDACEAE¹

Capparis cantoniensis Loureiro, *Fl. Coch. 331* (1790). — Merrill in *Trans. Am. Philos. Soc. n. ser.* 24: 173 (*Comm. Loureiro Fl. Coch.*) (1935).

Cudrania Bodinieri Léveillé in *Fedde, Rep. Spec. Nov.* 13: 265 (1914). — **Synon. nov.**

Vanieria Bodinieri (Lévl.) Chun in *Jour. Arnold Arb.* 8: 21 (1927).

CHINA. H o n g k o n g : torrent de la Baie du Télégraphe près Bethanie, *E. Bodinier*, no. 1413, Jan. 14, 1896, "grande liane épineuse" (holotype of *Cudrania Bodinieri*; photo. in A. A.).

The specimen cited above differs from typical *C. cantoniensis* in the leaves narrowed at the apex into an obtuse point, not acuminate; such leaves occur occasionally, but rarely, in other specimens, as in Y. Tsiang no. 1738 from the Lo-fou-shan, Kwangtung.

Capparis viminea Hooker f. & Thomson ex Hooker f., *Fl. Brit. Ind.* 1: 179 (1875).

Ficus Marchandii Léveillé in *Fedde, Rep. Spec. Nov.* 12: 533 (1913); *Fl. Kouy-Tchéou*, 432 (1915). — **Synon. nov.**

CHINA. K w e i c h o u : without locality, *J. Esquirol* (holotype of *Ficus Marchandii*; photo. in A. A.).

There are in this herbarium Chinese specimens referable to *C. viminea* from Hainan (McClure 9520, 20110) and from Yunnan (Henry 9124 and Schneider 3237).

This and the preceding species were identified by Dr. E. D. Merrill. *Ficus Marchandii* had been already recognized as representing appar-

¹See Vol. 10: 195.

ently a species of *Capparis* by Dr. Handel-Mazzetti in 1929 (Symb. Sin. 7: 100).

SAXIFRAGACEAE¹

Deutzia Esquirolii (Lévl.) Rehder in Jour. Arnold Arb. 14: 202 (1933).

Deutzia lancifolia Rehder in Sargent, Pl. Wilson. 1: 147 (1912); in Jour. Arnold Arb. 12: 276 (1931).

When referring in 1931 (l.c.) *Styrax Esquirolii* Lévl. and *Deutzia Chaffanjoni* Lévl. as synonyms to my *D. lancifolia*, I unfortunately overlooked that *Styrax Esquirolii* had priority over *D. lancifolia*. This mistake was corrected in 1933.

HAMAMELIDACEAE²

Bucklandia populnea R. Brown ex Wallich, Num. List. no. 7414 (1832), nom. nud. — R. Brown ex Griffith in As. Research. 19: 94 pl. 13, 14 (1836).

Aeschynanthus Esquirolii Léveillé in Fedde, Rep. Spec. Nov. 11: 495 (1913); Fl. Kouy-Tchéou, 180 (1914). — **Synon. nov.**

CHINA. K w e i c h o u : Tchei-chou, *J. Esquirol*, no. 732, "nom chinois Ma-ty-chou" (holotype of *Aeschynanthus Esquirolii*; photo. in A. A.).

According to a note on the type specimen it was referred to *Bucklandia* by Wm. G. Craib.

Distylium chinense (Franch.) Diels in Bot. Jahrb. 29: 380 (1900). — Handel-Mazzetti, Symb. Sin. 7: 53, in nota (1929). — Rehder in Jour. Arnold Arb. 12: 280 (1931).

Myrica Seguii Léveillé in Fedde, Rep. Spec. Nov. 12: 537 (1913).

Myrica rapaneoidea Léveillé in Bull. Acad. Intern. Géog. Bot. 24: 146 (1914); Fl. Kouy-Tchéou, 281 (1915). — **Synon. nov.**

CHINA. K w e i c h o u : without locality, *J. Cavalerie*, no. 3929, "arbrisseau" (holotype of *Myrica rapaneoidea* and of *M. Seguii*; photo. in A. A.).

On the label of Cavalerie's no. 3929 only the name *Myrica rapaneoidea* appears.

EUCOMMIACEAE

Eucommia ulmoides Oliver in Hooker's Ic. Pl. 20: t.1950 (1890). — Léveillé, Fl. Kouy-Tchéou, 268 (1915) "*ulmoidea*."

Eucommia ulmoidea Oliv. var. *yunnanensis* Léveillé, Cat. Pl. Yunnan, 174 (1916), nom. nud.

¹See Vol. 12: 275.

²See Vol. 12: 280.

CHINA. K w e i c h o u : Ko-tchiang-kéou, *J. Esquirol*, no. 637, Aug. 1905 (cited in *Fl. Kouy-Tchéou*; fragments in A. A.). Y u n - n a n : forêts de Long-ky, alt. 700 m., *E. E. Maire*, Aug. 1911-13 fragments in A. A.).

Eucommia ulmoides var. *yunnanensis* was published without description and locality, but the name refers doubtless to the specimen cited above which is the only one from Yunnan in the Lévillé herbarium. I can see no difference from the typical form. The specimen may be from a cultivated tree, for it is according to Hu (cf. *Icon. Pl. Sin.* 1: 26. 1927) an eastern tree, and is found in Hupeh and Szechuan only under cultivation. There is no specimen from Yunnan in the Arnold Arboretum herbarium.

ROSACEAE¹

Neillia sinensis Oliver in Hooker's *Icon.* 16: t.1540 (1886).

Neillia glandulocalyx Lévillé, *Fl. Kouy-Tchéou*, 348 (1915).

Neillia sinensis Oliv. f. *glanduligera* (Hemsl.) Rehder in *Jour. Arnold Arb.* 13: 299 (1932).

Neillia sinensis Oliv. var. *glanduligera* Hemsl. in herb. ex Rehder l.c., pro synonym., praeced.

In examining the numerous specimens of *Neillia* in this herbarium, I noticed that all flowering specimens had the calyx without glands, while in all fruiting specimens the calyx had gland-tipped setose hairs. On our cultivated plants, I was able to observe the gradual development of the glandular bristles after flowering which shows conclusively that "*glanduligera*" is not a distinct form or variety, but is descriptive of the calyx at the fruiting stage.

Spiraea Martini Lévl. — Rehder in *Jour. Arnold Arb.* 13: 300 (1932). — Handel-Mazzetti, *Symb. Sin.* 7: 452 (1933).

Handel-Mazzetti collected this species also in southwestern Szechuan.

Eriobotrya Cavaleriei (Lévl.) Rehder in *Jour. Arnold Arb.* 13: 307 (1932). — Handel-Mazzetti, *Symb. Sin.* 7: 477 (1933).

Handel-Mazzetti gives (l.c.) a complete description of the species and states that the description of the fruit is based on Wilson, *Arnold Arb. Exp.* no. 2993, distributed as *Pyrus Delavayi*, but in this herbarium Wilson no. 2993 is the type of *Sorbus aronioides* Rehd., and Wilson's specimen named by him *P. Delavayi* is no. 2998 and represents *Docynia rufifolia* (Lévl.) Rehd., not *Docynia Delavayi* (Fr.) Schneid.

Photinia Esquirolii (Lévl.), comb. nov.

Cotoneaster Esquirolii Lévillé, *Fl. Kouy-Tchéou*, 346 (1915). — Rehder in *Jour. Arnold Arb.* 13: 302, in nota (1932).

¹See Vol. 13: 299.

CHINA. Kweichou: bois de Ban-gnien, *J. Esquirol*, no. 2624, March 25, 1911, "couleur rosée" (holotype; photo. in A. A.).

Frutex ramulis gracilibus atrofusci sparse et inconspicue lenticellatis initio accumbenti-pilosus mox glabris. Folia brevissime petiolata petiolo 1–2 mm. longo accumbenti-piloso vel fere glabro, lamina oblonga vel oblongo-lanceolata, 4–6.5 cm. longa et 1.1–2.5 cm. lata, medio latissima, acuminata, basi rotundata vel late cuneata, minute et inconspicue serrulata denticulis mucronulatis accumbentibus vel partim fere integra, costâ mediâ utrinque pilosâ vel fere glabrâ exceptâ glabra vel fere glabra, nervis utrinsecus 10–12 tenuibus subtus leviter elevatis. Inflorescentia circiter 5-flora, 12 mm. alta, pedicellis 5–7 mm. longis, laxe accumbenti-pilosis non verrucosis; bracteolae minutae, lineari-lanceolatae, fugaces; alabastra tantum adsunt; calyx glaber, lobis rotundatis in mucronem subito productis intus villosis; petala orbicularia; stamina circiter 20, antheris oblongis; styli ad apicem connati, stigmatibus capitatis; ovarium apice villosum, 4-loculare.

As Léveillé's description is very brief, I have drawn up a new description as far as possible with the meagre type specimen which bears only a few flower-buds. Léveillé describes the fruit as "parvi, 5 × 5, nigricantes" but there are no fruits with the specimen and it seems unlikely that there were any, since the specimen was collected March 25.

The species seems to be most closely related to *Photinia brevipetiolata* Cardot of which I have seen no specimen. According to the description, it chiefly differs from Cardot's species in the indistinctly serrulate margin and the mostly rounded base of the leaves, in the larger inflorescence with longer pedicels and in the glabrous calyx. Cardot's species also comes from Kweichou, having been collected between Pin-fa and Kouyang by Cavalerie and Fortunat (no. 2607). If Léveillé's species should prove to be identical with *Ph. brevipetiolata*, the latter name would become a synonym of the new combination proposed above, since Léveillé's specific epithet has priority.

***Photinia Blinii* (Lévl.), comb. nov.**

Cotoneaster Blinii Léveillé, Cat. Pl. Yun-Nan, 229 (1917). — Rehder in Jour. Arnold Arb. 13: 302, in nota (1932).

CHINA. Kweichou: Goui-reou, lit même du fleuve, alt. 600 m., *J. Esquirol*, no. 3700, Oct. 2, 1912 (holotype; photo. in A. A.).

Frutex ramulis purpureo-brunneis glabris minute sparse lenticellatis novellis lanuginoso-tomentosis. Folia ut videtur decidua, breviter vel brevissime petiolata, lanceolata, majora circiter 3 cm. longa et 8 mm. lata, in apicem obtusiusculum minute mucronulatum attenuata, basi attenuata, integra vel indistincte crenulate, supra tomento lanugi-

noso mox evanescente, infra denso flavescente oblecta, costa supra leviter impressa subtus leviter elevata, nervis indistinctis. Flores non visi. Corymbus fructifer terminalis, 18 mm. altus, compactus, ramulis et pedicellis brevibus glabris purpureo-brunneis conspicue lenticellatis, fructibus paucis vel pluribus (1-5) ovoideis 6 mm. longis, calycis lobis triangularibus incurvis vix 1 mm. longis coronatis; ovarium triente superiore liberum, 3-loculare, semine unico evoluto ovoideo brunneo.

This plant apparently belongs to *Photinia* § *Pourthiaea*, as already indicated in a note on the type-sheet by Mr. W. E. Evans, but differs from all other species in the entire leaves and the one-seeded fruit; at least, in the two fruits I examined only one seed of the 3-celled ovary was developed which filled the whole ovary, the thin walls of the other two locules being pressed against the outer wall. The ovary is free from the calyx in the upper third, and there are remnants of 3 styles and of about 20 stamens. As the original description is very incomplete, a fuller description of the type specimen has been given above. As stated by the collector, the shrub grows in the river bed, and the shrubs are apparently at times wholly immersed in the water, since two of the branchlets are entirely enveloped by débris of vegetable matter such as is often carried by floods.

The development of leaves in the specimen seems abnormal, for the specimen having been collected in October with mature fruits, has no mature leaves, which were apparently destroyed and carried away by a flood. The leaves present are all young leaves, partly still unfolding which probably developed after the flood.

***Rosa multiflora* Thbg. var. *adenophora* Franchet & Savatier. — Rehder in Jour. Arnold Arb. 13: 310 (1932).**

Rosa Nakaiana Léveillé in Fedde, Rep. Spec. Nov. 10: 432 (1912).

Rosa polyantha S. & Z. var. *adenochaeta* Nakai in Tokyo Bot. Mag. 40: 569 (1926).

Boulenger (in Bull. Jard. Bot. Bruxelles, 9: 267, 1933) refers *Rosa Nakaiana* to *R. Luciae* as *R. Luciae* var. *Nakaiana* (Lévl.), but according to the type specimen of which I have a photograph and fragments before me, the styles of *R. Nakaiana* are glabrous as described by Léveillé, which removes it at once from *R. Luciae*. Boulenger does not cite the type of *R. Nakaiana* under his variety and may not have seen it.

***Rosa multiflora* var. *mokanensis* (Lévl.), comb. nov.**

Rosa Mokanensis Léveillé in Fedde, Rep. Spec. Nov. 7: 340 (1909). — Willmott, Gen. Rosa, 2: 511, t. (1914).

Rosa multiflora var. *quelpaertensis* Rehder & Wilson in Sargent, Pl. Wilson. 2: 335 (1915), quoad synonym. *R. mokanensis*.

Rosa calva Bouleng. var. *mokanensis* Boulenger in Bull. Jard. Bot. Bruxelles, 9: 270 (1933).

KOREA. *Quelpaert*: Moka, *E. Taquet*, no. 778 (770 ?), June 3, 1908 (holotype of *R. Mokanensis*, in part; photo. and isotype [770] in A. A.).

Boulenger separates (in Bull. Jard. Bot. Bruxelles, 9: 268-275. 1933) *Rosa multiflora* var. *calva* Franch. & Sav. from *R. multiflora* as a distinct species based chiefly on the glabrous pedicels of the former and refers to *R. calva* as varieties also *R. multiflora* var. *cathayensis* Rehd. & Wils. and var. *formosana* Cardot. I do not consider the character of pubescent or glabrous pedicels important enough for specific differentiation, but it may be used as a varietal character to distinguish var. *mokanensis* with glabrous pedicels from var. *quelpaertensis* with hairy pedicels.

The citation of the type of this variety represents two complications; the first is the fact that Taquet's number contains two specimens belonging to different species. However, the words "pedunculis glandulosis" of Léveillé's meagre description apply only to the left hand specimen, and the drawing published by Miss Willmott is clearly based on an identical specimen, probably sent to her by Léveillé. The right hand specimen on the sheet has perfectly smooth pedicels and a pubescent style and belongs to *R. Wichuraiana* Crép. The second complication is the question of the correct number which is cited by Léveillé as 778; this seems to be a mistake for on the label of the isotype in this herbarium, the number is clearly 770 and on Léveillé's type sheet, the last figure of the number is not at all like the "8" in 1908 of the same label. The mistake was already indicated by citing in Sargent, Pl. Wilson. 2: 335 the number as 770 followed by "778 (ex Léveillé)."

In regard to the name *R. calva*, it may be pointed out that, as this species includes *R. Mokanensis*, the latter name being the oldest specific epithet should have been used for the group.

Rosa multiflora var. *quelpaertensis* (Lévl.) Rehder & Wilson in Sargent, Pl. Wilson. 2: 335 (1915), and Rehder in Jour. Arnold Arb. 13: 310 (1932), excl. synonym. *R. mokanensis*. — Boulenger in Bull. Jard. Bot. Bruxelles, 9: 274 (1933)

Rosa polyantha S. & Z. var. *quelpaertensis* Nakai in Tokyo Bot. Mag. 40: 569 (1926), excl. synonym. *R. Mokanensis*.

As stated under the preceding variety, it seems best to treat *R. mokanensis* Lévl. as a distinct variety of *R. multiflora*.

Rosa Wichuraiana Crép. — Rehder in Jour. Arnold Arb. 13: 311 (1932).

Rosa Luciae Fr. & Sav. var. *Wichuraiana* Koidzumi in Jour. Coll. Sci. Univ. Tokyo, 34: 234 (1913). — Boulenger in Bull. Jard. Bot. Bruxelles 9: 264 (1933).

Rosa Luciae var. *Taquetiana* Boulenger, l.c. 267 (1933).

Rosa mokaensis Lévl. p.p. is probably best omitted from the synonymy, since this species seems to be based exclusively on the branch referable to *R. multiflora* (see above under *R. multiflora* var. *mokaensis*). In the enumeration of specimens Taquet no. 102 should be called holotype of *R. Taquetii* rather than syntype, since the other branch on the sheet did not enter in the description. Taquet no. 5586 is the holotype of *R. Luciae* var. *Taquetiana* Boulenger and seems to be a small-leaved form of *R. Wichuraiana*.

Koidzumi (l.c.), Cardot (in Bull. Mus. Paris, 23: 116, 1917) and Boulenger (l.c.) consider *R. Luciae* and *R. Wichuraiana* conspecific and distinguish the latter as a variety; the two species are undoubtedly closely related, but for the present I prefer to keep them distinct.

Rosa Gentiliana Léveillé & Vaniot. — Rehder & Wilson in Sargent, Pl. Wilson, 2: 312 (1915), excl. synonym. et speciminibus cit. — Rehder in Jour. Arnold Arb. 13: 313 (1932). — Boulenger in Bull. Jard. Bot. Bruxelles, 9: 260 (1933).

As Boulenger points out this rose is a doubtful species and belongs probably into the affinity of *R. Maximowicziana* Reg. and may be the same as *R. tsusimensis* Nakai which is unknown to me. The type specimen of *R. Gentiliana* seems to have been lost, but there exist two plates apparently drawn from the same specimen which have to serve as the type. I have seen so far no specimen which agrees with these drawings and all the material enumerated in 1915 by the writer and E. H. Wilson belong to another species described in 1933 by Boulenger as *R. Henryi*¹ which is easily distinguished from the true *R. Gentiliana* by the narrow entire stipules and the pubescent styles.

Rosa Rubus Léveillé & Vaniot. — Cardot in Bull. Mus. Paris, 23: 116 (1917). — Rolfe in Gard. Chron. ser. 3, 68: 59 (1920). — Täckholm in Act. Hort. Berg. 7: 104 (1922). — Rehder in Jour. Arnold Arb. 13: 312 (1932). — Boulenger in Bull. Jard. Bot. Bruxelles, 9: 234 (1933). — Rehder, Man. Cult. Trees & Shrubs, 431 (1927).

Cardot considers *R. Rubus* to be only a variety of *R. moschata*, but does not make a combination nor does he reduce it to synonymy.

¹ *Rosa Henryi* Boulenger in Bull. Jard. Bot. Bruxelles, 9: 231 (1933).

Rosa Gentiliana "Léveillé & Vaniot" sensu Rehder & Wilson in Sargent, Pl. Wilson, 2: 312 (1915), quoad synonym. cit. et specimina citata. — Rehder, Man. Cult. Trees Shrubs, 432 (1927). — Handel-Mazzetti, Symb. Sin. 7: 525 (1933). — Non Léveillé & Vaniot. Widely distributed through eastern, central and western China.

Rosa adenoclada Léveillé. — Rehder in Jour. Arnold Arb. 13: 314 (1932).

This rose is merely mentioned by Boulenger under *R. Henryi* (in Bull. Jard. Bot. Bruxelles, 9: 232 (1933) as not belonging to the *Synstylae*; he ventures no opinion about its relationship.

Rosa longicuspis A. Bertoloni. — Rehder in Jour. Arnold Arb. 13: 314 (1932).

Rosa Willmottiana Lévl. is considered a distinct species by Boulenger (in Bull. Jard. Bot. Bruxelles, 9: 232 (1933). Though perhaps not sufficiently different to be regarded as a species, it may be distinguished as a variety, as I have already intimated in 1932 (l.c.).

Rosa cymosa Trattinnick, Ros. Monog. 1: 27 (1823).

Rosa microcarpa Lindley. — Rehder in Jour. Arnold Arb. 13: 314 (1932). — Non Retzius (1803), nec Besser (1811).

On the cover of *Rosa microcarpa* and *R. Chaffanjonii* in the Léveillé herbarium appears the name *Rosa Patrum* Lévl. This is apparently a manuscript name and I find it only in the two manuscript works by Léveillé: *Rosetum universum* (1917) and *Catalogue illustré et alphabétique des plantes du Seu-Tchouan* (1918); in the first publication it appears as "113. *R. Patrum* Lévl. nov. nom. (*microcarpa* Lindl. 1820, non Retz. 1803," in the second publication the name appears only with a reference to the *Rosetum*.

As *Rosa microcarpa* Lindl. is a later homonym, *Rosa cymosa* Tratt. has to take its place. Léveillé overlooked the existence of *R. cymosa* and proposed *R. Patrum* for the preoccupied name.

Rosa Davidi Crép. var. *elongata* Rehder & Wilson. — Rehder in Jour. Arnold Arb. 13: 318 (1932).

Rosa Davidi var. *elongata* and *R. Parmentieri* Lévl. are cited by Boulenger (in Bull. Jard. Bot. Bruxelles, 13: 252 (1935) as synonyms of *R. Davidi* Crép.

Rosa sertata Rolfe. — Rehder, l.c. (1932).

Rosa sertata Rolfe and *R. iochanensis* Lévl. are cited by Boulenger (op. cit. 193) as synonyms of *R. Webbiana* Wall.

Rosa omeiensis Rolfe. — Rehder, l.c. (1932).

Rosa omeiensis Rolfe, *R. Sorbus* Lévl. and *R. Mairei* Lévl. are cited by Boulenger (op. cit. 192) as synonyms of *R. sericea* Lindl.

Rosa Mairei Léveillé. — Rehder, op. cit. 319 (1932). — Handel-Mazzetti, Symb. Sin. 7: 528 (1933).

Boulenger (op. cit. 192) considers *R. Mairei* a synonym of *R. sericea* Lindl.

Prunus Wilsonii (Diels ex Schneid.) Koehne var. **leiobotrys** Koehne in Sargent, Pl. Wilson. 1: 63 (1911). — Lévêillé, Fl. Kouy-Tchéou, 352 (1915).

Prunus Dunniana Lévêillé in Fedde, Rep. Spec. Nov. 10: 377 (1912).

CHINA. K w e i c h o u : Kai-tchéou, *Cavalerie*, no. 2985, June 1908, "grande arbre" (holotype of *P. Dunniana*; photo. in A. A.).

According to a note on the type specimen, this was determined by Koehne in 1913 as *P. Wilsonii* var. *leiobotrys* and subsequently enumerated by Lévêillé under that name in his Flore du Kouy-Tchéou. All the other specimens from Kweichou I have seen, as Tsiang nos. 4441, 6654, 7064 and 8870, belong to typical *P. Wilsonii* which has the rachis of the inflorescence pubescent.

(To be continued)

HERBARIUM, ARNOLD ARBORETUM,
HARVARD UNIVERSITY.

THE GENUS *CESTRUM* IN GUATEMALA¹

C. V. MORTON

THROUGH THE COURTESY of the Arnold Arboretum I have been enabled to study a collection of Solanaceae made in Guatemala by Dr. Alexander F. Skutch, who is to be congratulated not only upon the keenness of his collecting but the excellence of his specimens as well. Inasmuch as six new species of *Cestrum* were represented in the collection, the following short synopsis of the genus in Guatemala was prepared. However, the recent appearance of a comprehensive monograph of the genus by Dr. P. Francey² has necessitated the rewriting of certain portions in order to include the new species described by him. One of the new species collected by Dr. Skutch has been described on other material as *C. guatemalense* Francey. No other changes have been found necessary, except that I follow Dr. Francey in referring certain specimens, which I had previously called *C. megalophyllum* Dunal, to *C. Baenitzii* Lingelsh. These two species are, admittedly, too close and should perhaps be considered only varietally distinct.

The species of Guatemala are all of restricted altitudinal range, four (*C. Baenitzii*, *C. panamense*, *C. scandens*, and *C. nocturnum*) being wide-ranging species found from sea-level up to 1000 meters altitude, rarely up to 1500 in *C. nocturnum*. Eight (*C. dumetorum*, *C. lanatum*, *C. aurantiacum*, *C. elegantissimum*, *C. Skutchii*, *C. Franceyi*, *C. cobanense*, and *C. luteovirescens*) are species of middle elevations (1000 to 2000 meters) and are, except the first two, confined to Guatemala. Five (*C. fraternum*, *C. formosum*, *C. guatemalense*, *C. dasyanthum*, and *C. Regelii*) are montane species, endemic in western Guatemala and Chiapas.

In addition to the material of the genus in the Arnold Arboretum and the U. S. National Herbarium, I have had also the advantage of studying the Mexican and Central American specimens in the Gray Herbarium, the loan of which is gratefully acknowledged.

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²*Candollea* 6: 46-398 (1935) and 7: 1-132 (1936).

Appendage of the filament entire or merely notched; inflorescences chiefly axillary, not dichotomous, the flowers sessile

11. *C. nocturnum*.

Filaments exappendiculate.

Leaves hairy beneath. Montane species.

Calyx lobes long, subulate, green; corolla bright yellow

1. *C. Regelii*.

Calyx lobes short, broadly deltoid, purple; corolla yellowish, tinged with purple 19. *C. guatemalense*.

Leaves glabrous beneath.

Corolla bright yellow; flowers relatively long-pedicellate; montane species.

Corolla tube 2-2.5 mm. broad near the middle, not over 3 times as long as the calyx, gradually enlarged upwardly 17. *C. formosum*.

Corolla tube about 1 mm. broad near the middle, at least 5 times as long as the calyx, abruptly expanded near the summit 18. *C. pacayense*.

Corolla pale yellowish-green; flowers sessile or subsessile, corolla tube not over 1 mm. broad near the middle, at least 5 times as long as the calyx. Low-land species.

Leaves attenuate at base, broadest above the middle

6. *C. Baenitzii*.

Leaves rounded or nearly acute at base, broadest below the middle.

Corolla small, the tube not more than 14 mm. long, the lobes 4 mm. long 15. *C. panamense*.

Corolla large, the tube 17-20 mm. long, the lobes 7-9 mm. long 16. *C. scandens*.

1. *Cestrum Regelii* Planchon in Fl. des Serres, 9: 229, pl. 946 (1854).

Habrothamnus aurantiacus Regel, Ind. Sem. Hort. Turic. 1850 Coll. 4. note, fide Walp. Ann. 3: 176 (1852). Not *Cestrum aurantiacum* Lindl. (1844).

Cestrum chiapense Brandegee in Univ. Calif. Publ. Bot. 6: 192 (1915).

Cestrum jacaltenanginum Loesener in Verh. Bot. Ver. Brandenb. 65: 98 (1923).

Francey has attempted to maintain these three species as distinct, but the characters given to separate them seem not to hold in the material at hand. An additional species, which should perhaps have been included in the key, is *Cestrum psittacinum* Stapf (Curtis Bot. Mag. 152: pl. 9158. 1926), founded on cultivated material of unknown origin. This is very likely a native of Guatemala, for its relationship with *C. Regelii* is close. It differs in having bicolorous corollas (the tube

orange, the lobes green), in having shorter calyx lobes, and also in having the flowers borne in non-bracteate racemes.

I have seen the following specimens of *C. Regelii*: CHIAPAS: Cerro del Boqueron, *Purpus* 7170 (type collection of *C. chiapense*). GUATEMALA: Plains near Tecpam, Chimaltenango, *Skutch* 488. Jacaltenango, Huehuetenango, *Seler* 2641 (type collection of *C. jacaltenanginum*).

2. *Cestrum aurantiacum* Lindley in Bot. Reg. 30: Misc. 71 (1844).

Cestrum chaculanum Loesener in Verh. Bot. Ver. Brandenb. 65: 97 (1923).

Cestrum paucinervium Francey in Candollea, 6: 101 (1935). —

Synon. nov.

Cestrum aurantiacum var. *chaculanum* Francey in op. cit. 104. —

Synon. nov.

Francey has recognized several varieties of *C. aurantiacum*, as well as a new species (*C. paucinervium*) of this alliance. Of the latter I have examined a specimen of the type collection, and have not been able to separate it from typical *C. aurantiacum* either by leaves or inflorescence. The varieties are based on the size of leaves, petioles, and calyces. These differences seem artificial; but when the relative length of calyx and corolla is used as a means of separation, all the Guatemalan specimens are seen to have the corolla three times the length of the calyx or more. On the other hand, all the Costa Rican specimens have a corolla not more than twice as long as the calyx. This consistency in such an important character, coupled with the geographic separation of the two, shows that Klotzsch was very likely correct in considering that the Costa Rican plants represent a distinct species, *Cestrum Warscewiczii*.

In Guatemala *Cestrum aurantiacum* is a common species of middle elevations from 1300 to 2000 meters. The berries (not seen by Francey) are white, ellipsoidal, and very large. I have seen the following specimens from Guatemala, not cited by Francey: Coban, *Tuerckheim* 26a, 8433. Guatemala, *Tonduz* 625; *Hayes* s. n. Santa Rosa, *Cook & Doyle* 232. Santa Maria, *Kellerman* 5579. Volcán Fuego, *Donnell Smith* 2678. Without locality, *Heyde* 95. Santa María de Jesus Nepito, *Quetzaltenango*, *Skutch* 893.

3. *Cestrum lanatum* Martens & Galeotti in Bull. Acad. Brux. 12²: 146 (1845).

A distinctive species, found in Guatemala at elevations of 1200 to 1500 meters.

4. *Cestrum dasyanthum* Donnell Smith in Bot. Gaz. 23: 11 (1897).

A species of apparently restricted range. I have examined the following collections: Between San Martín and Todos Santos, Huehuetenango, *Nelson* 3622 (type); *Seler* 2632. San Juan Atitlán, Huehuetenango, *Skutch* 1157, 1178.

5. *Cestrum dumetorum* Schlechtendal in *Linnaea*, 7: 61 (1832).

A widely dispersed species, found in southern Guatemala in the Departments of Guatemala, Santa Rosa, and Amatitlán, at altitudes of 1000 to 1500 meters.

6. *Cestrum Baenitzii* Lingelsheim in Fedde, Rep. Spec. Nov. 7: 248 (1909).

Following Hemsley, the specimens cited below have previously been identified as *Cestrum macrophyllum* Vent., but that species has appendiculate filaments and is more closely allied to *C. laurifolium*. In Guatemala *C. Baenitzii* is found only near sea-level in the eastern part. The following collections have been studied. Quiriguá, Izabal, *Standley* 24481, 24533. Cubilquitz, Alta Verapaz, *Tuerckheim* 8558. Finca Sepacuité, Alta Verapaz, *Cook & Griggs* 845.

7. *Cestrum fraternum* Morton, sp. nov.

Frutex 2.4 m. altus; rami teretes, juniores puberuli, mox glabri; petioli 2.2 cm. longi, glabri; lamina foliorum elliptica, usque ad 16.5 cm. longa et 5.5 cm. lata, membranacea, apice acuminata, basi acuta vel obtusa, supra glabra, subtus costa et venis primariis parce puberula, venis primariis 10–13-jugis; inflorescentiae terminales et axillares, rachibus gracilibus puberulis, bracteis minutis caducis, pedicellis ca. 3 mm. longis; calycis tubus viridis, campanulatus, ca. 3.5 mm. longus et 2 mm. latus, glaber, lobis minutis late deltoideis plus minusve mucronatis ca. 0.5 mm. longis margine puberulis; corollae tubus pallide flavidus, interdum externe purpureo-tinctus, glaber, ca. 20 mm. longus, basi ca. 1.8 mm. latus, sursum sensim ampliatus sed non inflatus, fauce non contractus, ca. 5 mm. diam., lobis reflexis late ovatis, ca. 4 mm. longis et 3 mm. basi latis apice longe mucronatis; filamentorum pars libera ca. 3.5 mm. longa, glabra, basi appendiculata appendicula minuta rotundata pilosula, filamentorum pars adnata pilosula; stylus 18 mm. longus, paullo exsertus; fructus ignotus.

Type in the U. S. National Herbarium, no. 1,642,529, collected in moist thicket at Nebaj, Dept. of Quiché, Guatemala, altitude 2340 meters, Nov. 16, 1934, by A. F. Skutch, no. 1682 (isotype in Herb. Arnold Arb.).

8. *Cestrum Franceyi* Morton, nom. nov.

Cestrum pedunculatum Francey in Candollea, 7: 66 (1936). Not Sessé & Mocino (1894).

I have seen no material of this species other than two sheets of the type collection, *Tuerckheim* 833, from Pansamala.

9. ***Cestrum cobanense*** Francey in Candollea, 6: 372 (1935).

I have examined two sheets of the type collection (*Tuerckheim* II. 2372) and find this to be a well-marked species.

10. ***Cestrum evanidum*** Morton, sp. nov.

Frutex gracilis; rami teretes, juniores puberuli, mox glabri; petioli usque ad 1.4 cm. longi, glabri; folia juniora utrinque puberula, mox glabrata; lamina ovato-lanceolata, usque ad 13 cm. longa et 5 cm. lata, membranacea, apice acuminata, basi rotundata, venis secundariis 6–10-jugis; inflorescentia terminalis, pedunculata, dichotome ramosa, rhachibus gracilibus, glabris, viridibus, ebracteatis; calyx viridis, campanulatus, minimus, ca. 2 mm. longus, glaber, 5-costatus, basi plus minusve longe stipitato-pedicellatus, lobis parvis deltoideis aequalibus; corolla viridis, glabra, tubo angusto 20–23 mm. longo basi ca. 0.6 mm. lato sursum sensim ampliato et usque ad 3 mm. lato, fauce non contracto, lobis lanceolatis ca. 5 mm. longis; filamenta recta, glabra, appendiculata, appendicula magna bipartita glabra.

Type in the U. S. National Herbarium, no. 1,642,528, collected at Finca Moca, Dept. Suchitepequez, Guatemala, alt. 960 meters, Jan. 7, 1935, by A. F. Skutch, no. 2071A (isotype in Herb. Arnold Arb.).

The following specimen, distributed as *Cestrum nocturnum*, is also referred to *C. evanidum*: Acatepeque, Dept. Zacatepequez, Guatemala, alt. 1290 meters, *Donnell Smith* 2681.

The closest relationship of *Cestrum evanidum* is perhaps with *C. nocturnum*, a species which, in spite of its wide range, is relatively constant in appearance and essential characters. The inflorescences of *C. nocturnum* are chiefly axillary, are not dichotomous, and are usually without an obvious peduncle, characters which easily distinguish that species from *C. evanidum*, which has strictly terminal, dichotomously branched, pedunculate inflorescences. The calyx of the latter is obviously 5-ribbed and rather long-stipitate at base, but that of *C. nocturnum* is ribless and usually almost sessile. The filament appendages of *C. nocturnum* are sometimes inconspicuously notched, but are never deeply partite into two subulate lobes as in *C. evanidum*.

11. ***Cestrum nocturnum*** Linné, Sp. Pl. 191 (1753).

A common lowland species occurring from sea-level up to 1500 meters elevation.

12. *Cestrum elegantissimum* Morton, sp. nov.

Frutex 3.6 m. altus; rami teretes, glabri; folia dimorpha; petioli usque ad 1.2 cm. longi, glabri, supra canaliculati; lamina foliorum majorum oblongo-lanceolata, usque ad 16 cm. longa et 5 cm. lata, papyracea, apice longe et acriter acuminata, basi acuta vel obtusa vel rotundata, glabra, venis primariis utrinque elevatis 17–20-jugis ex costa angulo fere 90° egredientibus subrectis marginem versus furcatis, ramulis alteris utroque latere conjunctis; folia minora axillaria minuta, auriculiformia, stipuliformia, orbicularia, usque ad 1 cm. longa, petiolo nullo; inflorescentia terminalis, usque ad 13 cm. longa et 11 cm. lata, paniculata, ramulis infimis basi foliis auriculiformibus suffultis, rhachibus atropurpureis gracilibus puberulis, pilis hyalinis numerosis multiseptatis flaccidis interdum fortasse glanduliferis, bracteis atropurpureis linearibus vel lineari-subulatis parce puberulis plus minusve persistentibus, pedicellis brevibus 1–1.5 mm. longis crassiusculis parce puberulis; calyx atropurpureus, tubo cum pedicello continuo poculiformi ca. 2.5 mm. longo et 2 mm. lato extus pilos paucos gerente, lobis 5 regularibus deltoideis minutis ca. 0.8 mm. longis acuminatis margine dense puberulis; corolla flavescenti-viridis, haud purpurascens, tubo glabro ca. 21 mm. longo anguste tubuloso basi recto ca. 1.5 mm. lato, faucem versus paullo inflato ca. 2.5 mm. lato, fauce contracto ca. 2 mm. lato glabro, lobis patulis lanceolatis ca. 6 mm. longis et ca. 2 mm. latis acutis marginibus introflexis albis externe puberulis; filamenta (pars libera) 3 mm. longa, glabra, basi perspicue appendiculata appendiculis obtusis vix pilosulis, filamentorum parte adnata pilos paucos gerente; ovarium glabrum, perspicue stipitatum; stylus 18.5 mm. longus, glaber, sursum granuliferus; baccae non suppetunt.

Type in the U. S. National Herbarium, no. 1,642,527, collected in forest at Finca Moca, Dept. of Suchitepequez, Guatemala, altitude 1320 meters, Jan. 7, 1935, by A. F. Skutch, no. 2071 (isotype in Herb. Arnold Arb.).

13. *Cestrum Skutchii* Morton, sp. nov.

Frutex 1.5 m. altus; rami teretes, glabri; petioli usque ad 1 cm. longi, glabri; lamina foliorum linearis, usque ad 16 cm. longa et 2.6 cm. lata, membranacea, apice longe acuminata, basi acuta vel obtusa, glabra, venis primariis 15–20-jugis, marginem versus anastomosantibus, utrinque paullo elevatis; inflorescentiae axillares (et terminales?), densae, subspicatae, 3–9-florae, rhachibus atropurpureis glabris crassiusculis, bracteis atropurpureis linearibus fere glabris, pedicellis obsoletis ca. 0.5 mm. longis glabris; calycis tubus atropurpureus, tubulosus, 3.4–5 mm. longus, 2.25 mm. latus, glaber, lobis minutis rotundatis 0.4

mm. longis margine puberulis; corollae tubus albus, plus minusve purpureo-tinctus, glaber, 21 mm. longus, anguste tubulosus, basi ca. 1.5 mm. latus, sursum gradatim ampliatus sed non ventricosus, fauce non contractus, ca. 3.75 mm. latus, lobis albis vix purpureo-tinctis recurvatis late ovatis ca. 5 mm. longis et 3.75 mm. latis, margine introflexo latissimo externe puberulo; filamentorum pars libera 4 mm. longa, glabra, basi perspicue appendiculata appendiculis obtusis pilosulis, pars adnata pilosula; ovarium glabrum, stipitatum; stylus ca. 1.9 cm. longus; baccae non suppetunt.

Type in the U. S. National Herbarium, no. 1,642,526, collected in second growth thicket on the Volcán Zunil, Dept. of Quezaltenango, Guatemala, alt. 1710 meters, Aug. 8, 1934, by A. F. Skutch, no. 988 (isotype in Herb. Arnold Arb.).

14. **Cestrum luteovirescens** Francey in Candollea, 6: 349 (1935).

I have studied three specimens of the type collection, *Donnell Smith* 2679 from Capetillo.

15. **Cestrum panamense** Standley in Jour. Wash. Acad. 15: 460 (1925).

Cestrum racemosum var. *panamense* Francey in Candollea, 6: 274 (1935).

I am inclined to treat the present species as valid, in spite of its reduction by Francey to a variety of the Peruvian *C. racemosum*. In addition to the characters by which Francey separates the two, it may be pointed out that *C. racemosum* is a shrub only about a meter high, and that *C. panamense* is always a tree and often a very large one, up to 24 meters high, with a trunk three-fourths of a meter in diameter.

I have seen the following collections: Colomba, Dept. Quetzaltenango, *Skutch* 2000, 2024. Uaxactun, Petén, *Bartlett* 12175, 12743. Quiriguá, Izabal, *Standley* 23767, 24144. San Carlos, *Rojas* 207. Telemán, Alta Verapaz, *Donnell Smith* 1672. Near Patalul, *Kellerman* 5821.

16. **Cestrum scandens** Vahl, Eclog. Amer. 1: 24 (1796).

Cestrum perilambanon Loesener in Verh. Bot. Ver. Brandenb. 65: 98 (1923).

I have seen two collections from Guatemala: Chiquimula, altitude 165 meters, *Seler* 3381 (type collection of *C. perilambanon*). Cuyuta, Dept. Escuintla, 60 meters altitude, *Donnell Smith* 2081.

17. **Cestrum formosum** Morton, sp. nov.

Frutex gracilis, erectus, 4.5 m. altus; rami teretes, glabri; petioli satis longi, 17–23 mm. longi; lamina foliorum elliptica, usque ad 9 cm. longa

et 3.5 cm. lata, papyracea, apice acuminata, basi acuta vel obtusa, plerumque obliqua, utrinque glabra, venis primariis 9–11-jugis prominulis; inflorescentiae terminales et axillares, laxae, pauciflorae, pedunculatae, pedunculo usque ad 1.8 cm. longo, rhachibus glabris, bracteis linearibus glabris, pedicellis 4–5 mm. longis; calycis tubus viridis, campanulatus vel subturbinatus, ca. 4.5 mm. longus, 3.5 mm. latus, glaber, lobis minutissimis vix 0.25 mm. longis costa percurrente; corollae tubus luteus, glaber, crassiusculus, ca. 14 mm. longus, basi 2.5 mm. latus, sursum sensim ampliatus sed non inflatus, fauce non contractus, hic ca. 4.5 mm. latus, lobis patulis vel recurvatis crassis late ovatis ca. 4.5 mm. longis et 3.5 mm. basi latis apice mucronatis; filamentorum pars libera brevis, ca. 2 mm. longa, glabra, exappendiculata, pars adnata pilosula; stylus crassus, 12 mm. longus, paullo exsertus; fructus ignotus.

Type in the U. S. National Herbarium, no. 1,642,530, collected in bushy growth on the south slope of Volcán Atitlán, Dept. of Suchitepequez, Guatemala, altitude 2400 meters, Jan. 14, 1936, by A. F. Skutch, no. 2143 (isotype in Herb. Arnold Arb.

18. *Cestrum pacayense* Francey in Candollea, 6: 90 (1935).

Cestrum Kellermanii Francey in op. cit. 89. — **Synon. nov.**

I do not find any significant points of difference between these two species, the types of which have kindly been lent to me by the Field Museum. In leaf characters *C. pacayense* is almost identical with *C. formosum*, but the floral structure is different.

19. *Cestrum guatemalense* Francey in Candollea, 6: 98 (1935).

I believe that the present species must be referred to the section *EUCESTRUM*, as neither by calyx nor corolla does it correspond with the definition of the section *HABROTHAMNUS*, in which it is placed by Francey. The Skutch specimens cited below had been identified by me as a new species and distributed under a manuscript name. I have seen the following specimens: Hacienda Chaucol, alt. 3300 meters, Nelson 3645, 3666 bis (type collection). Chichavac, Chimaltenango, alt. 2490 meters, Skutch 27 and 754.

19a. *Cestrum guatemalense* var. *gracile* Morton, var. nov.

A var. *typica* calycis tubo puberulo, corollae tubo graciliore longiore (20 mm.) differt.

Type in the U. S. National Herbarium, no. 1,335,349, collected at Calél, Dept. Totonicapám, Guatemala, alt. 2550 meters, Nov. 1891, by W. C. Shannon (*Donnell Smith* no. 282).

UNITED STATES NATIONAL HERBARIUM,
SMITHSONIAN INSTITUTION, WASHINGTON, D. C.

A NEW SPECIES OF ACER FROM GUATEMALA

ALFRED REHDER

***Acer Skutchii*, sp. nov.**

Arbor ad 20-metralis, trunco 75 cm. diam., ramulis maturis glabris; gemma terminalis ovoidea, 4 mm. longa, perularum paribus 5–6, superioribus fulvo-villosulis, inferioribus glabrescentibus. Folia fere ad medium palmato-5-loba, 12–16 cm. longa, 14–20 lata, basi cordata sinu clauso lobis sese tegentibus, lobis triangulari-ovatis acuminatis, medio lateralibus paullo majore, leviter sinuato-lobulatis lobulis utrinque plerumque 2 rotundatis raro acutiusculis, lobis basalibus brevissimis acutis, supra glabra, subtus glauca, nervis primariis et secundariis elevatis dense villosa-tomentosis, in facie sparse lanuginoso-villosa, reticulata; petioli 2.5–11 cm. longi, dense villosa-tomentosi. Flores non visi. Inflorescentia, fructifera corymbosa valde ramosa, glabra, pedicellis ad 3 cm. longis; fructus alis ascendentibus angulo angusto divertigentibus, loculis circa 1 cm. longis 7–8 mm. diam. vix complanatis lateraliter obtusissime costatis laevibus supra et subtus leviter carinatis, alis 3.5–4.5 cm. longis et 1.2–1.4 cm. latis.

GUATEMALA. Dept. of Quiche: Nebaj, beside stream in open, alt. 6200 ft., *A. F. Skutch*, no. 1667, Nov. 15, 1934, "tree to 60 ft., diam. of trunk 30 in., leaves turning bright red and falling" (type in Herb. Arnold Arb.).

This new species is closely related to *Acer nigrum* Michx. f. and *A. saccharum* Marsh. and in its pubescence resembles *A. saccharum* var. *Schneckii* Rehd., but is easily distinguished by the large leaves deeply cordate at the base with closed sinus; in the latter character it agrees with *A. nigrum*, but the pubescence in *A. nigrum* is pilose, not villous-tomentose, and the under side of the leaves is green. From both species *A. Skutchii* differs in its much larger fruits with smooth, not reticulate, nutlets which are compressed from above and almost as broad as high, not laterally compressed with evenly rounded surfaces on both sides; the wings are up to 4.5 cm. long and to 1.4 cm. broad, while in *A. saccharum* and *A. nigrum* they are 1.5–3 cm. long and 0.6–1 cm. broad. There may be other differences in the flowers which are yet unknown.

At first I was uncertain whether this maple might not better be considered a variety of *A. saccharum*, since the differences are not of great morphological value, but its general appearance is strikingly different from the sugar maple, particularly in the thick, large and smooth nutlets which distinguish it at once; it is also geographically well separated, for *A. saccharum* ranges south only to eastern Texas, and is not found in Mexico at all.

HERBARIUM, ARNOLD ARBORETUM,
HARVARD UNIVERSITY.

POLYPLOIDY AND GEOGRAPHIC DISTRIBUTION IN SPIRAEA

KARL SAX

THE GENUS *Spiraea* is widely distributed in both the Old and New Worlds, although the center of distribution appears to be in Asia, where the genus is best represented. Polyploidy — both autopolyploidy and allopolyploidy — is a common feature in other members of the Rosaceae, and *Spiraea* is no exception in this respect. Many species appear to cross readily, which adds to the complexity of the genus.

Some cytological work has been done with *Spiraea* in connection with chromosome relationships in the Rosaceae and especially in relation to the origin of the Pomoideae (Sax 1932). The genus is not favorable for cytological work; the anthers are very small at the time of meiosis, the chromosomes are small and are differentiated from cytoplasmic inclusions with difficulty. The flowering period for the genus extends from April to July, so that collections must be made over a period of several months.

Chromosome counts were determined from aceto-carmine smear preparations. Pollen fertility was determined for various species and species hybrids, and the date of flowering was recorded. The basic chromosome number is 9, and not 8, as previously reported. In many cases it was difficult to determine the exact number of chromosomes, especially in some of the polyploids and species hybrids. The data obtained from the various species are recorded in Table I.

Most of the species of the first section of the genus are diploids with 9 pairs of chromosomes at meiosis. The two exceptions appear to be autopolyploids. *Spiraea myrtilloides*, a hexaploid, is similar to *S. gemmata*, and may be an autopolyploid form of the latter species, even though it is somewhat smaller. The other exception is clearly an autopolyploid of *S. chamaedryfolia*, giving rise to the variety *ulmifolia*. The variety is larger and has a greater distribution than the type, and tends to reproduce vegetatively by suckers. All species examined in the section Chamaedryon are relatively fertile. All are natives of the Old World and all are early-flowering.

Only three species in the section Calospira were studied. *Spiraea Miyabei* is an early-flowering diploid but is relatively sterile. Both the

TABLE I
SPECIES OF SPIRAEA

Species	Chromosome number	Pollen fertility	Date of flowering	Habitat
Sect. I				
<i>prunifolia</i>	2n	96%	May 1	O ¹
<i>Thunbergii</i>	2n	80%	May 1	O
<i>hypericifolia</i>	2n	70%	May 8	O
<i>nipponica</i>	2n	95%	May 28	O
<i>gemmata</i>	2n	94%	May 13	O
<i>mollifolia</i>	2n	81%	May 13	O
<i>myrtilloides</i>	6n	85%	May 20	O
<i>cana</i>	2n	97%	May 25	O
<i>media</i>	2n	60%	May 20	O
<i>chamaedryfolia</i>	2n	86%	May 13	O
— <i>ulmifolia</i>	4n	80%	May 20	O
<i>pubescens</i>	2n	75%	May 20	O
Sect. II				
<i>Miyabei</i>	2n	8%	May 1	O
<i>japonica</i>	2n	98%	June 26	O
<i>corymbosa</i>	3n	0	June 15	N ²
Sect. III				
<i>salicifolia</i>	4n	1%	July 2	O
<i>alba</i>	4n	99%	July 7	N
<i>latifolia</i>	4n	95%	July 2	N
<i>Douglasii</i>	4n	95%	July 2	N

good and imperfect pollen grains remain in tetrads at the time of flowering. Sterility appears to be caused by some general physiological factor, because there is little irregularity in meiosis, and all pollen grains in a given tetrad are either good or imperfect. This sterility can not be attributed to chromosome irregularities or to segregation of genetic factors. *Spiraea japonica* is the only late-flowering species which is known to be a diploid. The American species, *S. corymbosa*, is a triploid with complete pollen sterility. It must form viable egg cells or exist in a fertile diploid form, because it is involved in certain species hybrids.

¹Old World.

²New World.

All the species listed in the section *Spiraria* are tetraploids. These are late-blooming forms and, with the exception of *S. salicifolia*, they are highly fertile. Most of the species in this section are natives of North America. Two other American species, *S. Menziesii* and *S. tomentosa*, were available in the Arnold Arboretum, but we were unable to obtain chromosome counts. The flowers, at the time of meiosis, are very small, and the anthers are minute.

There are many species hybrids of *Spiraea* which have originated in nature or in cultivation. The chromosome number and pollen fertility have been determined for nine of these hybrids (Table II).

TABLE II
SPIRAEA SPECIES HYBRIDS

Hybrid	Chromosome number	Pollen fertility	Parent Habitat
<i>pikoviensis</i> (<i>crenata</i> × <i>media</i>)	4n	94%	O×O
<i>inflexa</i> (<i>crenata</i> × <i>cana</i>)	2n	95%	O×O
<i>pachystachys</i> (<i>corymbosa</i> × <i>Douglasii</i>)	3n	5%	N×N
<i>blanda</i> (<i>chinensis</i> × <i>cantonensis</i>)	2n	42%	O×O
<i>Billiardii</i> (<i>Douglasii</i> × <i>salicifolia</i>)	5 or 6n	1%	O×N
<i>notha</i> (<i>corymbosa</i> × <i>latifolia</i>)	4n	13%	N×N
<i>Margaritae</i> (<i>japonica</i> × (<i>albiflora</i> × <i>corymbosa</i>))	2 and 4n	0	O×N
<i>cinerea superhypericifolia</i> (<i>hypericifolia</i> × <i>cana</i>)	2n	65%	O×O
<i>intermedia</i> (<i>albiflora</i> × <i>Douglasii</i>)	4n	0	O×N

Two of the species hybrids, *S. pikoviensis* and *S. inflexa*, are highly fertile, and both involve Old World species in the first section of the genus. The parental species, *S. media* and *S. cana*, are known to be diploids, and since the hybrid, *S. inflexa*, is a diploid, the species *S. crenata* probably is a diploid. The hybrid *S. pikoviensis* is a tetraploid, apparently of allopolyploid origin.

Crosses between species in the first section also produce hybrids which are partially sterile. *Spiraea blanda* is a cross between the diploid species *S. chinensis* and *S. cantoniensis*. There is some irregularity in chromosome pairing at meiosis, and less than half of the pollen is good. The hybrid *S. cinerea superhypericifolia* is a hybrid segregate showing about 65 per cent fertility.

Several hybrids, *S. pachystachys*, *S. Billiardii*, *S. notha*, and *S. Margaritae*, are derived from either *S. corymbosa* or *S. salicifolia* as one of the parents. These two species, as represented in our collection, have little or no perfect pollen, and must have viable egg cells or include strains

which are more normal in fertility, in order to hybridize. The hybrids involving these parental species are highly sterile, even when both parents belong to the same section. It seems probable that the pollen-sterile parents have some viable egg cells but carry genetic factors for pollen sterility.

The hybrid *S. Billiardii* was produced by crossing two tetraploids, but the hybrid has more than $4n$ chromosomes and probably is a hexaploid. Apparently unreduced gametes were produced by one of the parental species. Confirmation of such behavior in *Spiraea* is found in the hybrid *S. Margaritae*, a backcross involving three species. In this hybrid both diploid and tetraploid pollen mother cells were observed in flowers from the same plant, but the divisions were somewhat irregular, and no good pollen was formed. In several species there were occasional microsporocytes with twice the normal chromosome number. Whether these were isolated tetraploid areas or the result of asynapsis could not be determined.

The relations between geographic distribution, polyploidy, and time of flowering are very marked in *Spiraea*. Most of the Old World species are early-flowering diploids, while all American species are late-flowering; and of those examined cytologically, all are tetraploids. Tetraploidy alone is not responsible for the delay in time of flowering, because the tetraploid variety of *S. chamaedryfolia* is little later than the diploid parent, and the only hexaploid species found is relatively early in flowering. In general, however, the polyploid forms in most genera flower later and over a longer period than the diploids (Müntzing 1936).

The greater vigor, hardiness, and adaptability of polyploids result in the extension of the range of certain genera (Tischler 1935, Müntzing 1936, Anderson and Sax 1936). The polyploids are more frequently found at the periphery of the range. In those genera of Old World origin which are also represented in North America, one might expect a greater proportion of polyploids in the New World. Such a relation is found in *Spiraea* and in certain other genera of the Rosaceae. In *Malus*, for example, most of the oriental species are diploids, while most of the American species are tetraploids. The oriental species flower earlier than the native species and, in the Arnold Arboretum, the flowering periods of the two groups do not overlap. There is somewhat more polyploidy in the native American species of *Rosa* than in the Old World forms, but in *Prunus* there seems to be no such relationship. A comparison of species in certain genera may not be reliable because so many species used for cytological work have been in cultivation for

many generations, and selection in cultivated forms is more likely to perpetuate polyploid variants (Anderson and Sax 1936). Most of the spiraeas in our collection are of recent introduction, and with the exception of some of the hybrids, their behavior should be comparable with those found in nature. Although there is a rather striking relationship between polyploidy, time of flowering, and geographic distribution in *Spiraea* and *Malus*, there are many genera of Asiatic origin which show no such relationships between the Old and New World species.

SUMMARY

The basic chromosome number for *Spiraea* is 9. Most of the Old World species are early-flowering diploids, while the American species studied are late-flowering tetraploids. Most species are relatively fertile, but several have little or no good pollen.

A few of the species hybrids are fertile, but most show a high degree of pollen sterility. Both allo- and autopolyploids are found in the genus.

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CYTOLOGICAL LABORATORY,
ARNOLD ARBORETUM, HARVARD UNIVERSITY.

THE ARNOLD ARBORETUM DURING THE FISCAL YEAR ENDED JUNE 30, 1936

STAFF CHANGES have been as follows. Professor Oakes Ames, Supervisor, having requested to be relieved of his multifarious administrative duties, was appointed by the University as Research Professor of Botany. He continued as Supervisor of the Arnold Arboretum until October 17, 1935 when I took over his duties as Acting Supervisor in addition to my general task as Administrator of Botanical Collections of Harvard University. The position of Administrator of Botanical Collections was created to further the task of coördination of the botanical activities, so admirably developed by Professor Ames, of the eight separately endowed units of Harvard University. These units are the Botanic Garden, the Gray Herbarium, the Botanical Museum, the Farlow Library and Herbarium in Cambridge, the Arnold Arboretum and the Bussey Institution in Jamaica Plain, the Harvard Forest at Petersham, and the Atkins Institution of the Arnold Arboretum at Soledad, Cienfuegos, Cuba.

Professor John George Jack became Assistant Professor of Dendrology, Emeritus, at the close of last year, while Dr. Donald Wyman was appointed as Horticulturist, effective January 1, 1936, succeeding Dr. Edgar Anderson, Arborist, who resigned at the end of the year to accept an appointment at Washington University, St. Louis. Associate Professor Karl Sax was promoted to full Professorship.

The Arboretum has continued to receive current gifts in support of its work from various interested individuals, while some additions have been made to the endowment. Perhaps the most important single gift was the Butler estate adjoining the Arboretum on Centre Street side. This was bequeathed to the Arboretum by Miss Isabel Butler and became available May 15th. It adds about 1½ acres to the Arboretum lands, and makes available one more dwelling house which has been designated as the official residence of the Supervisor.

Buildings and Grounds.—The winter of 1935–36 was much milder than the two preceding years. Although fairly low temperatures prevailed at times, no severe cold was experienced until after the middle of February, the lowest temperature of the winter being 13° below on February thirtieth. Light snow fell occasionally up to January nine-

teenth when the first heavy fall of snow, measuring one foot, occurred. This snowfall remained on the ground for several weeks, giving adequate protection to low-growing plants. Although the rainfall was very light from August to December there was no great injury to the plants from this cause. This limited rainfall was compensated by the snow in January, which was equivalent to over 8 inches of rain. Early spring rains were heavy in March and April, thus supplying sufficient moisture for general needs. Winter damage to trees and shrubs was no greater than during an average winter.

During the year, 1390 packages of seed were distributed, 1025 in the United States, 361 to 15 foreign countries; scions and cuttings of 899 species and varieties were supplied to institutions and individuals. There were received from various sources 334 packages of seed, 1351 living plants, and 121 cuttings and scions. Seven hundred and eighty-nine plants were added to various collections in the Arboretum.

Normal repairs to buildings were made as needed, and in the grounds various trees past their prime were removed. A vigorous spraying campaign was prosecuted to combat various insect pests and plant diseases.

Through the coöperation of the Park Department of the City of Boston, 300 feet of new wire fence was installed along the Nervine border to replace obsolete sections, and the fencing on both sides of the Jamaica Plain entrance, 150 feet, was completed, a much needed improvement. All boundary fences were painted. Roads, paths and benches were repaired and much attention was given to the problem of draining the bog opposite the Administration Building.

Pathological Laboratory.—The policy of exerting all possible efforts in furtherance of the campaign to stamp out the Dutch elm disease from the United States has been continued. Indications point to a successful issue of the campaign if prosecuted as now projected. Our efforts have comprised: — (1) Extension laboratory service; (2) Co-operation with other agencies animated by the same motives; (3) Direct pleas to the Federal government urging adequate appropriations; (4) Publication of the viewpoint of the Arboretum on the subject in a separate issue of its "Bulletin"; (5) Maintenance of a field laboratory on Long Island, N. Y.; (6) Researches on native wilt diseases of elms.

As matters of routine the laboratory has responded to a large number of inquiries on the diseases of many kinds of trees and shrubs, further developed its herbarium and reference collections and contributed a course at Harvard College on the pathology of woody plants.

Among the year's published results of investigations conducted by the laboratory special mention should be made of the following: (1) A preliminary paper by D. B. Creager throws light on the etiology and means of control of "Cephalosporium wilt disease" of elms. This disease is frequent and in some regions abundant from Minnesota to Maine and southward. Not only does it occur in established plantings but it has been and is unwittingly distributed from some nurseries because of existing lack of understanding of its nature and importance. (2) A paper by Dr. L. M. Hunter, monographic in scope, presents for the first time a detailed, systematic account of the morphology and the ontogeny of the spermogonia of the rust fungi that attack conifers. It is an admirable contribution to descriptive taxonomy; it also shows how certain species and genera can be distinguished from one another on their coniferous hosts alone — something that heretofore has often not been possible. (3) Three other papers, from Drs. J. H. Faull, I. H. Crowell, J. D. MacLachlan, respectively, materially extend our knowledge of the biology and the control of rusts of coniferous and pomaceous plants. One paper, dealing with two spruce rusts long known on their angiospermous hosts only, records experimental data showing that they alternate on spruces. The remaining two are significant, contributing as they do to a comprehensive understanding of Gymnosporangium rusts that alternate between Juniperus and pomaceous hosts and demonstrating practical means of control without having to resort to elimination of the alternate hosts.

Of the several researches that have been in progress, mention should be made of Dr. J. D. MacLachlan's work on a devastating disease of certain Myrtaceae, particularly pimento, the experimental part of which was carried out in Jamaica under the tenure of a Sheldon fellowship and in coöperation with the Jamaican government. He has solved the problem and showed that temperature is the decisive factor governing the spread of the disease. It is now clear that this crop asset, supposedly lost, can be perpetuated by establishing plantations at warmer levels (below approximately 1500 to 2000 feet altitude). Moreover, MacLachlan's findings with regard to the temperature factor call attention to a feature which probably influences the development of many other rust species.

The work of the laboratory has received generous recognition and support from various quarters. One result is a stimulus to effort. Another is provision for investigations otherwise not possible. Financial help, which is deeply appreciated, has come from the North Country Garden Club of Long Island, Mrs. Harold I. Pratt, the Massa-

chusetts Society for Promoting Agriculture, and the Noanett Garden Club.

Cytogenetic Laboratory.—The work on cytotaxonomic problems during the past year includes an analysis of American species of *Iris* by Dr. R. C. Foster, additional work on the Gymnosperms by Dr. Walter S. Flory, and an analysis of triploid varieties of *Malus* by Dr. Haig Dermen, and a study of polyploidy and geographic distribution in *Spiraea*.

Considerable work has been done on the experimental production of polyploidy. Extreme temperature variations produce chromosome doubling in the male gametes of *Rhoeo* and *Tradescantia*. Experiments involving the fertilized egg cells are in progress. Polyploid plants frequently are more vigorous and hardy than diploids, and the experimental production of polyploids may be of considerable practical value.

Work on chromosome structure in relation to meiosis and genetics has been continued. Dr. J. G. O'Mara has found that major coils in meiotic chromosomes can be suppressed by temperature treatment, and that these major coils are not a factor in chiasma formation. Relational coiling has been studied by Dr. L. Husted, who has used X-Ray-induced ring chromosomes for his analysis. The relational coiling in *Trillium* and *Vicia* has been studied finding that the direction of relational coiling is approximately at random for homologous chromosomes. This analysis is of interest in relation to the mechanism of crossing over. An analysis of chromosome behavior in relation to crossing over was presented at the 6th International Botanical Congress at Amsterdam.

The breeding work with ornamental shrubs has resulted in a number of hybrids which flowered this year. Many of the hybrids were made between American and Asiatic species, and these should be of value in a study of factors in speciation. Some of the hybrids should be of horticultural value.

The Herbarium.—During the past fiscal year 21363 specimens were distributed into the herbarium, bringing up the total to 430,062 mounted sheets. Of these accessions 6575 came from China, 5134 from Central and South America including Mexico, 2538 from Malaysia and India, 2167 from Australasia and 1330 from Africa.

Among the more important collections received during the last fiscal year may be mentioned 6647 specimens (including duplicates) from Hainan and Kwangtung, 3320 from Kwangsi and 1712 specimens from

Hunan, received from Lingnan University; about 10,000 numbers collected in Yunnan by H. C. Tsai, received from the Fan Memorial Institute; about 3000 numbers with many duplicates from Hainan, received from Sun Yatsen University; about 700 numbers with 5000 duplicates from Hunan received from the University of Nanking; 1280 numbers from Mexico collected by C. H. Mueller; 1369 numbers from Brazil collected by B. A. Krukoff; over 500 numbers of Brazilian plants collected by Riedel from 1831 to 1834, received from the Botanic Garden at Leningrad; 348 numbers from South America collected by Y. Mexia; over 200 numbers from Costa Rica collected by Alexander Skutch; 2095 numbers from Java and other Malayan islands received from the Botanic Garden at Buitenzorg; about 300 numbers of Malayan plants received from the Botanic Garden at Singapore; over 2000 Formosan plants collected by U. Faurie presented by Professor Oakes Ames; about 200 numbers from Central Asia received from the University at Taschkent; 510 numbers of European willows received from the Naturhistoriska Riksmuseet in Stockholm.

The fruit collection now contains 8432 specimens, 53 having been added during the year. Additions to the wood collection numbered 105 specimens bringing the total up to 3891.

The collection of photographic negatives of types and critical specimens, chiefly Chinese, now amounts to 3312 numbers, 300 having been added during the year. An alphabetical list of these has been prepared which will be sent on application to institutions desiring to exchange or to purchase prints.

During the year 2376 duplicates were distributed on our general exchange accounts and 1362 mounted sheets were loaned to specialists in Europe, America, and Asia for critical study.

Besides the constant use of the herbarium by members of the staff and also of other departments of the University for determination of plants sent in for identification, and of large collections chiefly from eastern Asia, the facilities of the herbarium have been used by visitors, among whom may be mentioned: Dr. N. C. Fassett, University of Wisconsin, Professor H. W. Rickett, University of Missouri, Professor Marie-Victorin, University of Montreal, Miss Alice Eastwood, California Academy of Science, Professor Wayne E. Manning, Smith College, Northampton, Mass., Dr. Clement G. Bowers, Maine, New York, Mr. F. Kingdon Ward, Cleve, England, and Mr. Paul Russell of the U. S. Department of Agriculture, Washington. Dr. Lawrence Ames of the U. S. Department of Agriculture, Washington has been provided with working quarters throughout the year.

Members of the staff have been engaged in work on special subjects. Dr. E. D. Merrill has identified various large collections from south-eastern China. Professor A. Rehder has identified several collections from the Kwangsi province and has continued his study of the ligneous Lévillé plants from eastern Asia. Dr. I. M. Johnston has continued his study of Boraginaceae and his identification of a large collection of plants from Chile; he also has written an account of South American species of *Astragalus*. Dr. H. M. Raup has worked up his collections made in the Athabaska-Great Slave Lake region, of which an account is being published in this Journal. Dr. C. E. Kobuski is continuing his study on the genus *Eurya* and Dr. Caroline K. Allen her work on the Chinese Lauraceae. Mrs. S. D. McKelvey has practically finished a monographic study of one group of *Yucca*. Mr. E. J. Palmer is continuing his revision of the American species of *Crataegus*.

Dr. Raup spent the entire summer of 1935 collecting in the Athabaska Lake district of northern Canada, and studying the distribution of types of vegetation in that region. The expense of this work was met in large part by a grant from the Milton Fund. About 1120 numbers of vascular plants were collected, averaging about $4\frac{1}{2}$ specimens to the number. In addition, about 60 numbers of fungi and about 40 of seeds were gathered, and a large collection of lichens and mosses was made. He devoted most of the winter to the determination and study of these collections, and to the preparation of the first half of a catalogue of the flora of the Athabaska-Great Slave Lake region. In this catalogue 11 new species and varieties are described, most of them collected during the 1935 explorations. His study of local climatic conditions in the Arboretum was continued throughout the winter. This consisted mainly in taking temperature records each day at three localities selected as being the most significant of those studied during the previous year.

In September 1935, Professor A. Rehder attended the International Botanical Congress at Amsterdam and took the opportunity to visit the herbaria at Edinburgh, Kew, Paris, Berlin, Leiden and Utrecht, bringing back photographs of types of about 230 plants, mostly Chinese.

Botanical exploration, partly financed by the Arnold Arboretum has been prosecuted in Mexico and in China. Mr. C. H. Mueller again visited the Sierra Madre Oriental, in northeastern Mexico, as mentioned in last year's report and returned in August with a collection of about 450 numbers. The expedition, under Mr. C. H. Wang, sent out by Professor H. H. Hu from the Fan Memorial Institute to Yunnan, partly to regions not touched by Handel-Mazzetti or Forrest, collected

about 8,000 specimens. Lingnan University had several collectors working under the direction of Dr. F. P. Metcalf in the Kwangtung province, who gathered about 10,000 specimens. An expedition of the University of Nanking, under the direction of Dr. A. N. Steward, collected during the summer and autumn about 700 numbers in Hunan.

Following the plan developed at the New York Botanical Garden, a start has been made in inserting clipped or typed original descriptions, critical notes, illustrations, etc. in the herbarium, pasting them on the outside of the specimen covers. This will eventually entail a general reorganization of the herbarium and a universal use of the specimen covers which were formerly not used at all. Descriptions appertaining to non-woody plants are transmitted to the Gray Herbarium. In acquiring material for the herbarium, a working arrangement has been made with the Gray Herbarium, whereby one institution will not subscribe to a set of plants that the other has ordered, this plan in general favoring the Gray Herbarium for American material and the Arnold Arboretum for Eurasian collections. The actual transfer of reference collections on permanent deposit as between the two institutions has been discussed, but until additional storage space becomes available in both units, no extensive consummation of such a plan is possible.

The Library.—The total number of publications is now 42,547 bound volumes, 11,476 pamphlets, and 17,762 photographs, 522 bound volumes, 559 pamphlets and 179 photographs having been added during the year. A total of 10,023 cards were prepared and distributed into the various indices, while 2815 slips were filed in the supplement to the author and subject catalogue to the library, making 22,805 ready for publication. Professor Oakes Ames presented 100 colored lantern slides, and through the generosity of Mrs. Louis A. Frothingham, Dr. Wyman was able to add 250 more, thus providing important facilities for members of the staff.

Forty-three new periodicals were added to the list of those currently received, these additions acquired chiefly by exchange, a few by gift; most of these are new ventures in the publication field having been commenced, for the most part, since 1930. Through the courtesy of Dr. R. Kanehira, we were fortunately able to acquire a complete set of the *Journal of Japanese Botany*, the early volumes of which are out of print and very difficult to secure. A number of important independently published volumes were acquired by purchase, exchange, and gift, thus adding to the resources of the library.

The library continues to attract seekers for information, 425 having

registered during the year. The policy of sending out inter-library loans has been continued, as this is advantageous to individuals living at a distance as well as to our own staff members who occasionally have need to consult works that are not represented in any of the libraries in or near Boston, which through the inter-library loan system we are often able to borrow for limited periods. When books could not be loaned, we have supplied typewritten excerpts or photostat copies.

To facilitate work in the herbarium and to save time of staff members, shelves were constructed at the ends of the herbarium cases on all the floors of the main herbarium and about 800 constantly used volumes were transferred to this new location thus relieving to a considerable extent the overcrowded shelves in a part of the library proper.

During the year, the usual numbers of the *Journal* and of the *Bulletin of Popular Information* were issued as well as one number of the *Contributions*.

Atkins Institution of the Arnold Arboretum, Soledad, Cienfuegos, Cuba. Mr. Robert M. Grey who since 1899 has constantly been associated with the plantings at Soledad, retired on June 1, 1936 the University granting him the title Superintendent, Emeritus. Mr. Grey, originally employed by Mr. Atkins to direct sugar cane breeding work, was unusually well qualified by training, experience, and inclinations to develop the planting program at Soledad. To his continuous and efficient efforts over a period of 36 years we are largely indebted for the present extensive gardens and for the comprehensive collections of tropical plants now growing at the Atkins Institution. His record of achievement was a remarkable one both in the field of plant breeding and in that of the introduction and establishment of exotic species. In 1933 the published list of species grown at Soledad approximated 1970 species. Additions from 1933 to 1935 through the combined efforts of Mr. Grey, Mr. Walsingham and other interested parties approximate 2470 species and varieties.

On the termination of Mr. Grey's long term of service we were particularly fortunate in securing as his successor the services of Mr. David Sturrock, who was appointed Superintendent in June, 1936. He is a widely experienced plantsman with 12 years actual experience as a resident of Cuba. Under his leadership it is confidently expected that rapid development and a further expansion of the already extensive plantings at Soledad will result.

The total rainfall at Soledad during the year was 55.73 inches, somewhat above the annual average. This was reasonably well distributed,

the plantings not suffering appreciably from drought at any time. While the weather conditions were generally conducive to normal growth, unfortunately cyclonic winds proved to be destructive on three occasions, July 26, Sept. 3, and Sept. 27-28, 1935. The first two storms were of minor importance but the last was the most disastrous hurricane ever recorded at Soledad. Its results were extremely devastating. The high winds with a velocity of from 80 to 90 miles per hour, or at times even higher, continued for over five hours. The lowest barometer pressure was 28.48 inches at 3 A. M. Sept. 28.

Surprisingly little rain accompanied this storm. Many of the fine old trees were uprooted or badly broken, and with few exceptions all were denuded of their foliage. Many large palms were blown down or their tops were snapped off. In the injured trees it was observed that, in due time, some sprouted vigorously from near the base while the upper parts died or produced only a stunted growth. On the south side of many trees the bark appeared as though it had been burned into the cambium layers; this later caused the death of several species.

After the storm 72 cords of heavy wood and over 200 ox-cart loads of fallen branches and other débris were removed, this giving some graphic idea of the wreckage and the extra labor required to bring the garden into a somewhat presentable condition following the storm. A generous donation from Mrs. Atkins and the transfer of a similar amount from Arboretum funds provided the means by which the rehabilitation work could proceed without delay.

Following the storm necessary repairs were made to Harvard House and other structures. New construction includes the new seboruco dam and bridge, and a new road along the west bank of the arroyo below the cycad collections. The boundary fences have been repaired and small extensions made to the water distributing system. Much time had to be devoted to relabeling the arboretum specimens as over 200 labels were lost during the hurricane and others were in poor condition. The improved labels now used are much more satisfactory than the old ones being more durable and more economical than those formerly used.

Large additions were made to the succulent collections, chiefly through the Harvard Botanic Garden, the N. Y. Botanical Garden, and La Mortola Garden in Italy. The orchid collections have received extensive additions, particularly those sent by Mr. C. H. Lankester from Costa Rica, about 350 species now being represented. The rock garden has been increased to twice its former size. The lily, amaryllis, and ginger collections were transferred to a better location.

The seed and plant exchange program has been continued. Over 650

living plants, including 246 orchids, 95 cuttings, and 345 packets of seeds were received from various institutions and individuals thus adding many new and valuable species to the living collections. Large collections of living plants, bud wood, and cuttings, as well as 471 packets of seeds were distributed in connection with the general exchanges of such material.

Over 250 species represented by about 750 specimens were labeled, hardened up out of doors, and planted in various parts of the arboretum. The spring plantings were commenced April 17, following the first heavy rains; and completed on May 25.

In general, in addition to the heavy rehabilitation burden entailed by the destructive hurricane of Sept. 27-28, routine garden work such as cleaning, weeding, mowing, pruning, the eradication of diseases and insect pests, watering when necessary, and other incidentals have been given the usual attention.

Professor Thomas Barbour, Custodian, as usual spent several weeks at Soledad in February, arranging for the necessary repairs to Harvard House and conferring with Mr. Grey as to which damaged trees should be removed entirely and what should be pruned and allowed to rehabilitate themselves, and going over the collections at Harvard House to be sure of their freedom from pests, and to check their general condition after the storm. He is also publishing a report on the destruction of birds by the storm.

During the year Dr. Philip Darlington continued entomological studies which he had begun on previous visits. Professor J. H. Faull spent several weeks studying fungous diseases of the pimento tree and allies. Messrs. R. H. Goodwin and A. L. de Lisle, both graduate students, visited the Garden on University Fellowships to gather material for study in Cambridge. Dr. A. G. Kevorkian spent some time studying aquatic fungi and had the experience of being at the Laboratory during the great storm.

During the fiscal year 1935-36 grants or fellowships have been awarded to six students whose work at the Garden will be noticed next year.

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WILLIAM HENRY JUDD, Propagator.

CORRECTIONS

Page 69, under **Castanopsis Eyrei** omit the synonyms *Castanopsis neo-Cavaleriei* and *C. tribuloides* var. *echidnocarpa*.

“ 118, line 7 for **Fauliana** read **Faullianum**.

“ 198, line 3 from below for **Saggitaria** read **Sagittaria**.

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